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DESCRIPTION OF STRATHNAVER, MORVICH, AND CULMAILY FARMS, IN THE COUNTY OF SUTHERLAND [SCOTLAND.]

Communicated by Patrick Sellar.

From the 'Reports of Select Farms.'

Introduction.—The county of Sutherland is situated in the 58th degree of north latitude, parallel to Gottenburgh in Sweden, and Labrador in America, and not two degrees further south than Cape Farewell in Greenland. Its climate, and its productions, and the style of farming followed to bring these last to maturity, must differ, in many particulars, from what prevails in England.

It consists of a peninsula, nearly of a square form, washed on the west by the Atlantic, on the north by the Great North Sea, and on the east and south-east by the county of Caithness, and by that portion of the German ocean called the Moray Firth. The exhalations which are produced by these great bodies of water moderate the rigours of winter, and the heats of summer; causing at the same time a dampness during every season, more especially in the vernal and autumnal equinoxes, favorable to grass; but not in every year propitious to the sowing or the ripening of corn.

The centre and east portion of this district, excepting a narrow stripe along the south-east coast, scarcely two miles in breadth, rests on mountains of gneiss and micaceous schistus, with here and there a mass of primary limestone, or a bluff hill of old red sandstone* placed upon it. The whole is broken into abundance of wild, and, on the west coast, savage scenery; subdivided by many lakes and streams of water, and covered chiefly with peat bog, on which grow the eriophori, carices, junci, ericæ, and other alpine plants, given in his kindness by providence to those countries, where the extreme length of winter and the absence of spring forbid, during a great portion of the year, the vegetation of plants of a more feeding, but less hardy nature.

The tillage farming of the county may, with one exception on the north coast in the limestone district, be said to be limited to the south eastern stripe of coast above mentioned; where the gneiss changes into sandstone, and where breccia of various combinations, and coal measures, are tumbled together in great confusion, and covered with debris from the neighboring mountains. Here there has been formed a soil, consisting of loam of different depths, approaching in some spots to coarse alluvial matter of considerable tenacity, but all of it adapted, when limed, to the growth of heavy crops of turnips.

The mountainous part of the country is placed chiefly under sheep. It exports annually *one hundred and eighty thousand fleeces* to employ, and *forty thousand sheep* to feed, the English manufacturer. The shores abound in fish, and its fisheries afford more than *fifty thousand barrels of herrings* to the same end; that is to say, either for direct consumption in England, or for Ireland, where they set free an equal value of food better adapted for the English market. The part of the country employed in tillage, exports to the south country several cargoes of corn, some choice Highland whisky, and a good many droves of cattle; but it is chiefly available for the esculent food, and the refuge during winter which it affords to the weaker portion of the flocks that occupy the great extent of pastoral country, with which it is by the wise provision of nature connected.

Of the above-mentioned agricultural produce of the county of Sutherland, the writer of this report may annually export about one-twentieth part of each of the above mentioned species of produce, varying in amount according to the nature of the season, and the skill and industry of the persons employed in directing, superintending, and carrying through the operations necessary to improve the quality and preserve the health of the stock, in raising the necessary food, and in defending it against the effects of climate.

He will proceed to describe—1st. his farms, which belong in property to the Marquis and Marchioness of Stafford, and he will explain,

2dly. The management employed in each department to bring out and realize the produce.

Description of farm.—The first and most important part of the farm possessed by the reporter is in Strathnaver, a tract of mountain land, on the north coast of the county, in latitude* 58° 30', situated betwixt Loch Naver and the sea. The river Naver runs through it from south to north, and it extends, at its greatest breadth, from Loch Laygal on the west, to Badanloch on the east.

The pasturage consists of a great variety of plants, singularly adapted to the maintenance, during every month of the year, of the only domesticated animal possessed of a cover adequate to defend it by day and night from the effects of such a climate—so light in weight, as not to sink in the peat bog where it finds its food; and with power and instinct to *spiel*† the inaccessible crags, with which such a country abounds.

* The old red sandstone on the west coast extends from Clachtoll in Assynt on the south, to Culkein on the north. It includes the lofty interior mountains of Sonlbhein, Canisp, and Quenag. From thence to island Handa the coast is composed of round, lumpy hills of gneiss, stretching up to the base of the lofty quartz mountains of the Diriemore. The coast north therefrom, to the vicinity of Cape Wrath, which is granite, is composed of the old red sandstone. To the east of the Cape it is again found, forming the lofty cliffs of Clochmore and Far-out-head. The mountain limestone also forms two considerable ranges; the one commencing on the north coast at Ellan Garrow, running to the south of Far-out, extends to the point of Sangoemore, stretching into the interior to the west summit of the lofty mountain of Ben Spiunniue. The next stretches along the greater portion of Loch Eribol, and includes Ellan Choirie to the top of that sea loch. The rest of the county comes within the general description in the text.

* Within about one hundred miles of the latitude of Greenland.

† Climb.

Where the waters, by cutting out ravines, glens, and straths, have formed an alluvial soil, composed of the debris of the mountain rocks mixed with peat, there the finer sorts of plants appear. These plants vary according to the quality of the component parts whereof the soil on which they grow consists. On spots, for instance, where the decomposing felspar abounds, some natural clover, rye-grass, yarrow or millefoil, mountain daisy, primrose, and other plants of first quality are discovered—mixed with the holcus mollis, agrostes, airæ, &c. which are natural to the decomposing mica—with the fescue grass, brome grass, common bent, heather, *et hoc genus omne*, which is content with the nourishment to be derived from the sterile bank of quartz gravel. In this respect the pastures of the county of Sutherland possess an advantage over many tracts exhibiting a more flattering outline; and with the ever varying proportions and combinations of matter contained in its gneiss, there is throughout the country an infinite mixture of the plants best suited for the maintenance of 'keeping stock' during every season of the year; which grasses, by the irregular bursting out of rocks in a state of partial decomposition, and by the serpentine course of burns and waters, are ultimately interwoven with the alpine plants that grow upon the peat-bog, and form the principal part of the maintenance of the stock.

Of these alpine plants, there exists a considerable number and variety. On the knolls, the heather *(erica vulgaris)* prevails. It fills with seed, ripening in all seasons of ordinary fertility, like a field of corn,* and forms a principal part of the food of stock, during the wet months of October, November, December, and January. In exposed situations, the shepherds burn it, and the sheep eat the young shoots in August and September. In lower positions it is left to come to greater length, so that the sheep may work down to it in time of snow, and in order to afford shelter in lambing time. Adjoining to the heather, the sheep find, on the peat of damper and deeper quality, the ling *(erica tetralix)*, cotton grass *(eriophorum vaginatum)*, rasp grass *(carex cæspitosa)*. The leaves of these plants they consume along with the heather, during the autumn and winter months. In February the heather has lost its seed. It is succeeded by the pry *(carex panica,)* the stool bent *(juncus squarrosus)*, and by thick beds of the flowers of the cotton grass, which are found in the latter end of February, and beginning of March, pointing with great vigor to the cheerless sun of that wet and uncomfortable season. These plants continue in use, until the second or third week of April; and during all this time, they furnish for *keeping* stock, food of the best quality and in the greatest abundance. From this date to the middle of May, a link is in this country wanting in the chain of alpine eatage. On well drained and moderately stocked ground, the finer qualities, which in this season begin to spring, supply the defect, but under different management, the 'hunger rot' and a train of consequent ills sometimes ensue. In the middle of May, however, the deer hair *(scirpus cæspitosus)* takes the place of the moss. It shoots through the ground like a thick braird of corn, and with the fine grasses, by this time in full vigor, provides for stock most abundantly, until the month of August; when the ground is lightened by the departure of the annual cast or sale lot of sheep; and the young heather and ling come again into play.

The next part of the concern, comprising Morvich and Culmaily, consists of a tract in Strath Fleet, and on the shores of the south-east coast of Sutherland. On the south and west it rests on the sides of a pretty considerable chain of mountain, composed of inclined red sandstone, called Bhen Bhragie and Bhen Lundie. That part of this farm which falls down on the south side of the mountain, to a flat of more than four hundred and fifty imperial acres of tillage land, is Culmaily Farm; and is chiefly composed of a sharp gravelly black loam, incumbent on sandstone of very compact quality, and on the debris of the sandstone and gneiss rocks, which abound in the neighborhood, mixed up with some sea sand and calcareous matter infused into the mass, at some remote period when it must have been covered with salt water. The other part, which is on the west side of the mountain, is barely within the gneiss district; it descends to the base of a precipitous mass of rock, composed in a great measure, of amorphous felspar, at the bottom of which is the alluvial flat of 'Morvich,' formed of a deep and pretty strong clay loam, in some part covered with moss, and measuring better than two hundred imperial acres of tillage land.

It is not immaterial to the reader to know, that of these tillage farms, full two hundred and fifty acres have been converted from moor, moss, and pasture, into tillage land, by the reporter, and that he has thoroughly manured the whole six hundred and fifty acres with lime imported from England; and he mentions these facts here, in order to afford him this opportunity of adding, that he was induced to make such extensive improvements by the liberal terms granted in his first lease, the unsolicited addition of nine years to its endurance, and the abatements of rent given and other acts of kindness which have been, by the venerable marquis and his noble lady, conferred upon him, in common with the other tenantry of the estate.

He will not tire the reader with a detail of the numerous little experiments which have led him, step by step, to his present system of management—a system containing many imperfections to be discovered, possibly, and corrected, and in no way so likely as by the comparison of the details of his management with those of other and better-informed farmers, who may be induced, like him, to communicate their stock of ideas to this society, for the purpose of being added to the general fund collected by them, for the use of the profession.

Management.—The first outline of his management is this: he breeds and rears his flocks in Strathnaver, devoting Morvich and its adjoining pasturage grounds as a refuge for the weak end of his ewe stock, and for the purpose of preparing his sale ewes for market; Culmaily being used as the refuge for the weak end of his wether stock, and for preparing his sale lot of wethers for market. At Morvich, too, he keeps under his own eye the *élite* of his ewe stock, from which his tups are bred, and at Culmaily his tups, which are marched off to the ewe flocks in Strathnaver at the appointed time.

* In 1816 it filled very imperfectly, and the consequences to the flocks were deeply felt during the ensuing winter.

In going more into detail, he shall divide what he has to say into two parts—the *first* concerns his tillage, the *second* the management of his flocks.

1. *Tillage.*—His tillage land is subdivided into twenty-one inclosures, the fences of which are dikes or stone walls, all built by the tenant*, viz. sixteen at Culmaily, and five at Morvich. The sixteen at Culmaily are wrought in three-shifts, viz., six fields of the lightest quality in the course are under the rotation of—first, turnips; second barley; three, four, five, grass; six oats; ten fields, or two fives, are thus cropped—first, turnips; second, barley; three, four, grass; five wheat; the five inclosures at Morvich in this course—first, rape or cole and naked fallow; second, wheat, three, four grass; five, oats. He grows no more potatoes than are necessary for the subsistence of the people employed, and these are grown among his green crops in alternate stripes of six drills of each kind.

On each of the two above-mentioned divisions of the tillage farm there is a suitable onstead of farm buildings, and a powerful thrashing mill impelled by water. On Culmaily are meal and barley mills of small size, also impelled by water, for the manufacture of his corn.

His whole tillage, as well as the transport of his wool and materials necessary for the stock land, is performed by six pairs of horses†, a grieve or bailiff, six ploughmen, and a spadesman; a second grieve or bailiff to superintend the women, employed on the farm, a millwright, and sixteen women for the two thrashing mills. In summer these sixteen women, with fourteen to twenty boys and girls, according to circumstances, in addition, clean the green crops; and in harvest ten to eleven bandwin or from sixty to sixty-six reapers, with ten to eleven binders, under the superintendence of the second bailiff, cut down, bind and stock the crop. The grieve has at command a hardy highland pony; and the farmer, who resides at Morvich, two riding horses, to one of which can be yoked a light gig, for his conveyence to distant parts of the farm.

He will proceed to describe, as briefly as possible, first, the habits of his people and the practices used in his tillage farm; and secondly, the particular detail of his tillage applied to each species of crop grown.

The grieve or bailiff and four of the ploughmen are married men. Each of these families possesses, during the year, a house and garden, a milch cow, at all times well fed, thirteen Scots bolls or 16¼ cwt. of oatmeal, three Scotch bolls or about three cart loads of potatoes, a limited quantity of English coals, of the best quality, and a money wage. That of the grieve varies with circumstances. The money wages of the ploughmen may average about ten pounds each. For the above allowance each family keeps a young man within the house, and, if any circumstance put two young men to lodge with one of the families, there is allowed 6½ bolls of oatmeal, one boll of potatoes, fifty-two shillings per annum, and some coals, for the additional lodger. When the force comes to Morvich the men are fed in family with the shepherds there, and 17½ pounds of meal per week are deducted from each man during the time he is so maintained.

Various plans have been tried on the farm; but for several years the above-described method has been adhered to as that which, on the whole, has wrought best. The young men were found to be made more steady by the society of the married family, and the married servant went with a better spirit through the *unremitting labor* attendant on his lot, when he saw his family admitted to as much comfort as could, in these bad times, be afforded; and the prospect before him of assistance from each of his children, as soon as they could gather a weed or hoe a turnip.

There are eight additional families on the skirts of the tillage farm; each of whom at a nominal rent possesses a house and garden, a cow's grass, and a patch of ground, and who, when required, work on day's wages: the younger children at fourpence, girls at sixpence, old men and lads at one shilling, and able men at one shilling and sixpence per day of ten hours. Their cows are not well fed; they give no milk in winter; but each family has a trifle of bear or bigg* in a small stack behind his house, from each two pecks (three pecks imperial) of which his wife could brew sixty quarts of small beer for her family, were she not prevented by the fifty penalties of the cruel and impolitic malt laws.

In the latitude of Sutherland there is a great diversity in the length of the day and night, at different seasons of the year. From the middle of November to the 1st of February there is no light to perform field work before eight o'clock in the morning, or after four o'clock at night. The practice at this season is, for the families to start at a little past six, and light their lamps. By the light of these, while the women prepare breakfast, the men clean their horses, water them, put the harness on them, one feed of corn† for each horse into the manger, and another into the mouth bags. At dawn they draw out and begin a yoking or journey, which, with an interval of twenty minutes to empty the mouth bags, lasts until dark. They then return, water their horses and wash their feet, unharness and dress them; fill the rack with oat straw, and the manger with well-washed yellow turnips, on which the horses amuse themselves until eight o'clock. The men in the mean time dine, and at eight a bell is rung, the lamps lighted, the horses thoroughly dressed, the racks again replenished with fodder, and the manger cleaned out and filled with a mash, made by one of the ploughmen during the evening of the preceding day, consisting of one feed of light corn for each horse, boiled up or rather stewed with yellow turnips cut down, bran from the meal mill and chaff. This closes the duty of the day; the men sup, go to bed, and sleep soundly until six o'clock again rouses them to their work.

In February, the day lengthens out, and the yoking lengthens with it until it extends to two journeys of five hours each; at which time the horses begin to be fed with hay in place of straw. The lengthening day now gives an interval for dinner at mid-day, which increases, by the 20th of May, to three hours; and this interval is permitted

* An allowance, or 'meliorations,' to be paid by the landlord to the tenant for certain improvements, at the end of the term, is stipulated for in the lease.

† Seven pairs, including one pair of mares in foal, and one pair of young horses *thrown off to grass during summer*.

* A species of barley.

† One peck and one gallon imperial, make four Scotch lippies or feeds.

to them for dinner and rest. They dine at eleven; and most frequently sleep behind their horses from twelve to nearly two o'clock, when they begin their second yoking of five hours. By nine o'clock they are all in bed.

At this time the green crop seed-time begins, and with it the two journeys increase to eleven, and sometimes twelve hours, the horses getting three feeds each per day. The people, at this time, start, feed, and breakfast at four, yoke at five, rest at eleven, when they dine, and rest till two. At this hour they begin the second journey, which lasts until seven, half past seven, or eight, according to circumstances. These seeds are all got in before the 1st of July. The horses are then put to grass: young horses allowed to amuse themselves for the season, and the remaining five pairs restricted to two feeds of corn and ten hours' work, until the cold nights of autumn bring them back to the comforts of their stable; and the short day of November to the arrangement which was followed in that month of the previous year.

The yearly expense of one man and pair, fed and wrought according to the above method, is 80*l*. For the whole six hundred and fifty acres, and other cartage, six pairs, being at the rate of one hundred and eight and a half imperial, or about eighty-six old Scotch acres per pair. The grieve never leaves these teams: he sees them dressed and fed, and he sees them wrought; and the master's eye follows him in every step. The fields are ploughed in regular divisions, the strength concentrated almost perpetually to one object in one field, and the carriage performed to time, by regular yokings; and the writer does not think, that a much better extent of work could be performed, at the same expense, with justice to the men and cattle. At the same time he is aware of imperfections; and if better farmers will give a minute detail of their mode of working, he will gladly borrow from their better judgment.

Piece or task work, except in small detached jobs, has not yet found its way much into tillage work in Sutherland. To greater exertions than time-work it certainly leads, and to greater irregularities than is admissible in a well-regulated system; but it saves the trouble of superintendence.

The duty of the second grieve is to attend the thrashings that are performed by the millwright and eight women at each onstead; to watch over the care of one hundred and sixty wintering cattle under the superintendence of three lads; to hand weed the fallow breaks, and to hoe better than one hundred and twenty acres of rape and turnips; and with ten or eleven bandwin or bands of reapers to cut, bind, and stock the crops.

In thrashing, the first rope of thatch is loosened, and the sluice drawn at eight o'clock: one of the women, with a boy and horse, carts in the corn; the miller feeds; the seven girls attend, each her particular part of the machinery; and by four o'clock, the fodder of two ten-quarter stacks is thoroughly separated from the corn, and strewed for the cattle, the corn separated from the chaff, and measured over by the second grieve and miller to the granary-keeper; and this person's receipt for the quantity in the master's pocket. The expense may be as follows:

	£.	s.	d.
Millwright, two-thirds of a day -	0	1	8
Second grieve - - - -	0	1	0
Eight women, say eight hours, 64—say 64 days - - - - - -	0	3	3
One lad and cart - - - -	0	3	0
Say 5¼*d.* per quarter -	0	8	11

This, for oats, barley, and wheat, may cost sevenpence to eightpence per quarter.

No other general remark occurs, except on the subject of manure. On Culmaily-farm there is a very considerable supply of sea-ware, of very excellent quality; on Morvich, which is more inland, there is great abundance of fern or breekan (filices), which grows luxuriantly on the soil composed of the debris of the felspar rock, and yields potash. It is the practice to mix the sea-weed with the court-dung, in alternate strata. The dunghills so formed being hard trampled down by the carts and the feet of cattle, the mass is found in the beginning of May to be strongly saturated with an infusion of the muriate of soda. It is turned over and slightly covered with mould, for fermentation, preparatory to its being applied to the soil, and it forms a manure of the very first quality. The ferns are cut green, brought together into a great stack, where they ferment to a considerable degree; they are subsequently trampled down under the sheep's feet at sortings, smearing, and at shearing time; and being mixed and further fermented in the mass with court or fold dung, they are therewith applied to the naked fallows about to be sown with wheat.

The first and most important part of the rotation employed, is the growth of the green crop, that is cole and turnips; for they are managed in precisely the same manner. This species of crop is most important in two respects; first, as the pharmacopœia for the whole stock on the farm, and secondly as the key-stone of the system of tillage farming employed—and that on which the quantity and quality of each succeeding crop of the rotation depends.

Green crop.—The green crop, of course, succeeds a culmiferous or corn crop. The first operation is the furrow, in the direction of the former ridges, given immediately after harvest and the conclusion of the wheat seed: the ground is cast into breaks fifteen yards broad, and the ploughing so deep as to leave some of the lime visible below the plough sole. When this work has been completed, the field is neatly water-furrowed, and left to receive the fertilizing effects of winter.

On fields of light soil, when the crop is intended to be sown on bonedust, the gates remain shut until after the conclusion of the oat-seed in March. On loams of heavier quality, where dung is to be employed, four dunghills are founded on the headridge, two at each end of the field. The foundation is composed of virgin mould or ditch scourings, two feet deep; over this are placed, in alternate strata, four layers of fold dung, and four of sea-weed; and the mass, when completed, is neatly spaded up, covered on the sides and top with mould, and the field shut up to wait further progress at a more advanced period.

When the oat-seed has been completed, the gates are opened, the water-furrows shut by the plough, the field thoroughly harrowed and hand weeded, cross ploughed in wide breaks, and again harrowed to perfection, and every weed gathered into heaps, burned, and the ashes spread. This done and the dunghills being at the same time

turned for fermentation, the gates are again shut, until the completion of the barley-seed, when the tillage is renewed in one of two ways. If a very light field, it is again severely harrowed by cattle travelling at a quick pace, and hand picked, &c.: if a field of better staple, it undergoes a third ploughing across the former one, a rolling, harrowing, and hand picking; and in both cases it is left in a highly-pulverized state to wait until seed time. When the people open the gates to begin sowing, they like to find a young and scarcely perceptible braird or growth of annual weeds thinly scattered on the surface.

At the time of sowing green crops in Sutherland the dusk or twilight of the evening glides into that of the morning, without passing into night; when the sun has a most powerful influence. The seed process is, therefore, carried through with every possible despatch. The method followed is twofold: in each case it is preceded by a deep furrow-line, to define the head-ridge on each of the four sides of the field.

1. Where dung is to be employed, two ploughs, which are yoked twenty minutes before the carters, open drills, furrowing an acute angle with the side ridges; to favor the admixture of the dung next season in the mass of the field, these furrows are from twenty-seven to thirty inches wide, according to the quality of the soil. Four single carts follow, two at each end of the drills at the rate of fifteen to twenty tons per acre. Six girls spread the dung as fast as the carters deposit it. Two ploughs, which yoke forty minutes later than the carters, cover in the dung. A few boys and girls hand-pick the whole. The sowing machine follows and rolls in the seed; and at the termination of each yoking, three acres, which at the beginning lay flat and damp from the former tillage, is drilled, dunged, covered, hand-picked, sown and completed. The machine sows two drills at once. Its rollers are formed to encompass and embrace each drill. The two sets of rollers (one for each drill) are separate, and diverge on an iron axle in such a manner, that they can be made to deposit the seed only on the top of the drill, immediately incumbent on the manure—a condition which insures a more equal and a better crop than where less perfect tillage is employed.

2. When bone-dust is used, fourteen quarters of the manure is wet and covered for fermentation forty-eight hours before the yoking begins. The horses cart this to the field at yoking time, and the loads are set down at measured distances in different parts of the field. Two ploughs open the drills; ten boys and girls manure, carry, and sow the dust into the drill, which is in a state of incipient fermentation. Four ploughs instantly cover in. The sowing machine follows, and from four and a half to five acres are completed at a yoking. The machine is regulated to sow from one to four pounds of seed per acre, according to the farmer's intention. The quantity sown is generally about two pounds to the imperial acre. In all cases the seeds are floated, the lights are skimmed off, and the good seeds dried with flour of sulphur, all at the time of sowing. The sulphur is thought to preserve the seed from vermin. The dampness, however, communicated by the floating to the seed, and the fermentation incipient in the manure, does, with greater certainty, at that sunny season, send up a regular vigorous braid, and carry it quickly to the rough leaf, at which state it is secure from the fly.

Some farmers use bone-dust sowing machines drawn by two horses. The writer of this report, on the whole, prefers manual labor, performed after the fashion above described, to any sowing machine which he has yet seen.

Besides rape or cole he grows four different kinds of turnips. At the part nearest to the mountain (intended to be first used by the sheep) white globe; in the middle, red top and green mixed, four drills and four drills alternately; at the bottom, for spring eatage, yellow, one-fourth part may be white globe, two-fourths, or rather better, red and green, and the remainder, where the field suits, yellow. The white, for early eatage in November and December, and for quantity per acre, are unequalled, but their thin skin renders them too tender for the frosts of January and February. The red and green, with great bulk, are proof against the severities of winter. The writer of this report mixes them agreeably to that law of nature which gives *none* of its eatage in one single species; and he thinks the sheep like the variety which is in the two sorts mixed. The yellows, as they retain their sap longest, are decidedly the best for the spring months. The different sorts are made to follow each other in the same drill, by using different seed-boxes, which are exchanged at the different parts marked in the field; the removed one being laid down on the top of the nearest two drills to wait the return of the machine.

The Scotch farmer will pardon this minute detail of his every day work, which is submitted to the English reader in case he should choose to give a fair trial to the *drill* husbandry in the cultivation of turnips.

The writer invariably grows his own turnip seeds. He plants his four different lots of roots far distant from each other, to prevent hybrid admixture, having first selected the roots with great care from the field in which they had been sown. Where, in the course of his little tours, or by correspondence, he can pick up small samples of what is called good seed, he sows them, marks the drill in his weekly report, and pricks from them in the ensuing month of November whatever may seem likely to give a good cross in his seed plots, one load to ten of his own sort, perhaps; less or more as he may judge advisable at the time: it is a measure to be adopted with great caution. Some samples which he obtained from Aikeld and Kelham, in Northumberland, from Samuston, Roxburghshire, from Leaming Lane, in Yorkshire, and from Dalswinton, in Dumfresshire, have done him a deal of good; other samples obtained from gardeners and nurserymen have turned out to be trash in some cases, and in others to be of the very best breeds.

But to return to the tillage: the green crop sowing begins with the rape, as formerly mentioned, about the 25th of May; it concludes before the last week in June. Two horse hoe harrows, followed by twenty or thirty hand hoes, attended by the second grieve, are then set on, first to the rape, and so forward through the turnips, to the latest sown crops. By the time the latest sown is completed, the first sown is ready for the second hoeing. The horse hoers then exchange their harrows for small double mould-board ploughs: with these they set up the crop lightly, and thus,

about the middle of August, concludes the tillage. In some cases, however, a second, and more effectual setting up takes place in the month of December, of that part of the crop intended for latest use, after the first frosts have made it plain that no further increase of crop is to be expected.

By the above process the ground is left without the vestige of a weed, and the crop does, generally, in every case, completely cover the soil. The Culmaily turnips have, this season, been tried by pulling and weighing measured spaces, as fairly as possible, over different parts of the field, and the following are the results:

	Fold Manure	Bone Dust	Average.
White globe per imperial acre	T. 20 8 2	T. 35 2 3	T. 27 15 2½
ditto	18 5 1	33 17 0	23 1 0½
Green Top - - -	18 1 0	31 10 1	24 15 2½
Field yellow - - -	0 0 0	25 12 3	

This was not a fair experiment betwixt bone manure and fold dung mixed with decomposed sea-weed, since that sown with dust was much the best field of the two. But it shows clearly the proportions which the different sorts of turnips bear to each other, and the causes why, for keeping stock, the writer prefers to have his greatest quantity of the coarser and more common sorts. Of Swedes and mangel-wurzel, he has, for many years, grown none. Whether from the nature of the climate or the soil, he could never bring them to a full crop, and as his sheep hospital, in a great measure, breaks up when the cotton grass comes into flower in March, he found no inducement that he could balance against the sacrifice of quantity.

Barley.—When the turnips have been eaten off by sheep, the surface of the field bears some resemblance to a macadamised road. So far as compression goes, it is certainly not much different from lea, when about to be broken up after pasture. It is usual to cross-rib and harrow it before giving the seed furrow. In strong land, indeed, it sometimes gets a previous clean cross furrow; in soft sandy loams a seed furrow on the turnip break is found quite sufficient. No weeds grow among the corn sown up to grass, and it is never drilled, but invariably sown broad cast. The broadest sowing machine, is an invaluable article, although extremely apt to be bent in the rods, and otherwise spoiled, by the rough, and unskilful hands, which use it. The quantity of seed given varies from three to five bushels, according to the quality of the soil. The seed time endures from the 1st of April, to the 1st of May, Early sowing has not been tried; but by what is said on that subject in the Society's report, No. 1, the writer of this paper intends to make the experiment in February, and March first. The returns vary from thirty-nine to fifty bushels of a dark coloured heavy weighing grain, in good favor with distillers.

Grass.—One advantage derived from our late period of sowing is the opportunity afforded of putting in the grass seeds in good time to be covered by the last turn of the harrows, which follow the seed corn; a method affording a better braird and more vigorous plants than when the seeds are rolled in after the barley has got above ground. On soil of the first quality one bushel pacey rye-grass, having a good admixture of rib grass in it, eight pounds white clover, six pounds red, and six pounds trefoil. On soil of the second quality, one bushel and a half ray-grass, eight pounds white, four pounds red, and six pounds trefoil; and on third quality, two pounds of ray-grass, eight pounds white, six pounds trefoil, are usually given; to which, in very light moor land, he has very successfully substituted for barley half a peck of rape seed. In this last case an inclosure of very worthless land becomes, both in autumn and spring (April), a nursery for the weak part of young stock of first quality.

One inclosure, of best quality, is invariably set aside for hay to the working horses. That it may come early to the swaith, it is never permitted to eat it down in autumn. To save the esculence of the hay and the fertility of the field, it is cut the instant the ray-grass comes into flower (excepting what is required for next year's ray-grass seed,) and an exertion is made to get the hay carried before the 8th or 10th of July.

1st. That the aftermath may be, at speaning* time, open to recruit the weakest and worst fed lambs; and 2dly, that the hay making may be put past, after the cleaning of the rape, and before the succession of turnips sown, press, for hoeing, on the hay-makers. The young people employed on these works are sure to quit the farmer by the 1st of August, to employ themselves in the herring fishery; and the farmer, whose summer hand work is not, by that time, completed, has a very poor chance, for that season, to bring his green crops to a successful termination.

Besides this field appropriated for hay, the rotation gives six inclosures at Culmaily, and two at Morvich for pasture. The two at Morvich are devoted as a summer nursery for the ewe stock; one at Culmaily as summer nursery for the wether stock; one for the 'work horses, colts, and servants' cows; and the remaining four prepare the sale cattle for market. The fields at Morvich not being eaten bare by the sheep, the scythe is passed over them as soon as the lambs have been speaned, and the ewes sent to the heather: the grass cut, made into hay, and carted off as speedily as possible, that a short close bite may in good time succeed for the further progress of the stock.

The cattle alluded to are all bought in from the people who are settled round the shores of Sutherland, in small lots of land, for the prosecution of the herring fishing. These people have one, two, or three cows each. They sell the calves at from nine months to a year old. The tillage farmers buy them, and prepare them to travel south. The writer of this report uses nearly from seven to eight scores. He buys them in April, puts them, during summer, on his *superabundance* of deer hair, transfers them from that in August to certain coarse rushy loams, where coarse grass grows, brings them to his courtines at Morvich and Culmaily to eat straw in winter, and finishes them off for the road during next summer in the inclosures above mentioned. With some little assistance from the field appropriated to the horses, the four fields summer, on an average, with attention, at the rate of 1½ per acre. It is the practice to fill up two fields with three cattle per acre, and to shift once a fortnight.

The breed is the Norland Kyloe crossed, in some cases, with the Argyleshire breed, of which the noble marquis has long kept a selected breed at Dunrobin. I am of opinion that had proper skill and attention been used to infuse the Argyle-

* Weaning.

shire blood into the Norland breed of the country during the last thirty years, during which his lordship has possessed the means of doing so from Dunrobin, they would, at this date, have doubled the value of the cattle export of the county of Sutherland. Assuredly the farmers could afford to the people for their yearlings twice the price now paid were they bred in a different manner; and this remark is peculiarly applicable to the north coast, where a great mixture of worthless Caithness blood prevails.

The sales for the southern market happen in July, August, and September, and they clear the fields in order to prepare them for sowing wheat.

Wheat.—Until bone-dust manure came into use, this mode of cultivation could not be advantageously followed; and it is doubtful whether oats may not, by-and-by, be found, after lea, the best crop of the two. In the mean time no farmer can refuse the premium offered by the cornlaws, of 60*s.* for wheat, in preference to 24*s.* for oats.

The first operation is, to spread the dung saved from the green crop on the leas. On strong lands a cross rib or break furrow is usually given a few weeks before the seed furrow. To prevent the seed from being deposited too deeply in the soil, it is usual to give one stroke of the harrows before the sower. The seed being steeped in the field among stale urine, lights are skimmed off, and the good corn is instantly dried with hot lime and sown, and no smut has hitherto followed. On light sharp loam, and on the rape land previously eaten down by the small sheep it is sown upon one furrow; and in all cases the field is directly and effectually water-furrowed, and shut up for winter.

The produce varies from twenty, to forty bushels per acre. The species sown is the thin chaffed Essex; in some cases the Talavera. The quality produced is coarse, and generally ground down for ship biscuit. A few additional plantations and greater skill may improve the quality in a degree. Still wheat is not naturally fit for the country or the climate.

Oats.—On the lightest soil in Culmaily the author sows Angus oats after one furrow in spring: on the whole leas at Morvich, potato oats after the same degree of cultivation. The Angus oats are generally consumed in horse food, the other in meal, for the use of from thirty to forty families employed on the farm.

The oat straw is given to the horses in winter, and to the Kyloes at that time when the eatage has got bare, and the turnips cannot be spared from the young stock, which wait, at Culmaily, for the return of the flower of the cotton grass.

Sheep.—But, most assuredly in such a country as nine-tenths of the county of Sutherland is, sheep are at present the only animals fitted for converting the vegetation into realizable value; and without free use of that part of the country fitted by nature for affording to the flocks refuge from the wintry storms of the gneiss-district of mountain lands, *that value cannot be brought out.* On some ill laid out farms, not one half, and others not much above one-third of the lambs bred, come to be sold as grown sheep; and the survivors, when sold, are of inferior quality, and bring a very poor price.

The plan followed by the writer of this report to save these losses, and to make his sheep worthy a better price, he will frankly lay before the reader, after premising, first, his consiousness of many imperfections in it, and secondly, that what suits his particular position may very possibly be unadapted to any other farm; and most assuredly it is so, according as the nature of the ground, the climate, the extent, or the position of each particular farm, with respect to markets, varies from another.

The sheep reared by the reporter, is the Cheviot, which is one of the many varieties into which the *ovis aries anglica* has, during the lapse of ages, multiplied in consequence of the differences in climate, food, and treatment, to which it has been subjected. The Cheviot hills are, perhaps, the steepest and the highest ground in England to which this species of sheep has been naturalized; and it is quite comprehensible for a store farmer to understand how nature, seconded by the wishes of the shepherd, should have gradually changed the forms of any of the low country varieties, to the light fore-ended, short and close woolled animal which is found among the border mountains. In fact, one can scarcely treat on the pasture of the Cheviot and survey the plains below, without seeing, that as often as the ancient borderer brought to his mountains the varieties of stock found in the neighboring vales, the scanty spring food, the elastic air, and other peculiar features of this new country, behoved to fashion the *survivors* of the lambs there bred, and even if young, the ewes that suckled them, to the small-neck, light fore-end, fine short stunted wool and other properties of the old Cheviot breed.

The Messrs. Robsons, of Belford, Samuston, and Philogar, in Roxburghshire (from whose stock a great portion of the reporter's sheep have been bred), informed him that, about the year 1770 that family imported from Lincoln, Gloucester, or Hereford, several sheep, a slight infusion of the blood of which into their flocks was attended by the best effects. Betwixt that time and the year 1790 the discovery of the use of green crops and various other improvements had been made, and must have greatly forwarded the views of the spirited and intelligent border farmers of those days. From the year 1790 to the year 1800 the weight of the Cheviot fleece is quoted at 2½ to 3½ lbs., and the quarter of mutton 12 to 18lbs. At this day (1830) the weight of the reporter's sheep bred in Sutherland may be—fleece 4 to 4¼ lbs.; quarter from 18 to 26 lbs. avoirdupois. Certainly in strength of withers, fulness and breadth of chest, strength of loins, length, breadth, and cleaving of the rump, depth of twist, and furnishings of the arms and thighs, most likely, too, in constitution and propensity to feed, the Cheviot sheep of this day exceed that which went before them.

The reporter's sale sheep are marked as in the foot-note*. They have generally been fed for the Leeds, Manchester, and Liverpool markets (though some of the ewes have been, and are now, feeding

* Each sheep has the letter C branded or burned in the tar cheek, and an S imprinted with tar on the near rib.

Each wedder has a fore bit and hole cut with an iron out of the far ear.

Each ewe has four bits in the one ear and a fork in the top of the opposite one.

Some of his admirers have been known to *go to market* with the S, but they have not yet ventured to assume the other marks.

much further south); and it may happen, that some reader of this report may have seen, and will know them, by the marks now given.

When he determined to put his pasture land under Cheviot sheep, he resolved thoroughly to drain the surface of it in the manner then done on the eastern borders, and to put his flocks under the superintendence of border shepherds. They were chiefly young men, who married and brought north their sweethearts with them. He settled them in cottages on suitable parts of the farm; giving to each, where the situation admitted of it a young man to board with them, in the manner agreed on with his tillage servants. The shepherds' wages, however, much exceed those given to ploughmen. If a shepherd does his duty, he must exercise a deal of consideration, and undergo much hardship; to which the man whose sleep is soundest in the wildest storm, and whose meat is regularly placed before him daily at certain hours, is not subjected. The householder is afforded a cottage and garden, thirteen bolls of meal, grass for three cows and one pony, with the profit to be derived from seventy Cheviot sheep of the different sorts each, mixed among the master's sheep of the same kind. The young men get board and lodging in the householder's family, and the profit derived from sixty sheep. The reporter employing eleven married shepherds and eight young men, this gives the number of twelve hundred and fifty shepherds' sheep or packs mingled among the master's flocks and spread over the farm;* and thus, something very like a partnership concern tacitly exists between master and servant; for although the management rests entirely with the master and his managing shepherd, yet is every shepherd, old and young, deeply interested in the skill, prudence, and vigor employed; and that master will prosper badly who does not hear, and patiently inquire into, all that every shepherd has to say, concerning each and every part of the management; taking due care as he goes on, as much as possible, to identify the interest of each with that of the whole community.

Before explaining his particular mode of working the stock of this farm with Morvich and Culmaily the reporter must mention one or two particulars appertaining to the farm, which had weight with him in deciding on that management. In the first place there turned out to be no one herding on it, where in the ordinary mode of laying on and tending lambs or hogs, they could be kept, without an enormous loss, by an inflammatory disease of the stomach, called 'sickness,' or 'braxy.' They were tried in separate herdings, and they were tried following their mothers throughout the year; but with such bad success, that the loss seldom fell short of fifteen per cent., and varied betwixt that and thirty. Secondly, several of the herdings, which were in a greater degree incumbent on mica slate, with little variety of fine grass on them were found subject to a disease called pining—a general wasting of the body, and prostration of the strength of the animal, followed, if not cured, by death. And lastly, the skins brought in were found to consist, in a great degree, of those of the youngest and worst-fed lambs, which fell at every age by pining or drowning, or both, after having gone through the ordeal of the braxy.

Four remedies for these evils were devised, and with some success. First, for the pining, it occurred that the immediate removal of the patient from its former 'haill' or herding, to felspar land, and from that, if necessary, to the sandstone land at Culmaily, might be efficacious. It was tried, and with such good effect, that, when taken in time, the felspar land alone answered the purpose. In other cases they were obliged to be sent down to Culmaily. Secondly—The wedder lambs, five hours of rape and turnips, with nineteen hours of heather, per day and night, effectually saved. Thirdly—As it had been discovered that, after several years' depasture of certain herdings by old sheep, lambs might, for one year, be trusted on them, if well herded; therefore, in order to save the ewe lambs, the farm was thrown into the following courses—Nos. 1, 7, 4, of Strathnaver and Morvich were called four-ewe and ewe-hog herdings, of which three kept ewe flocks, and the fourth ewe hogs, after it had been three years bitten by grown sheep, and Nos. 2, 6, 9, were wedder herdings, one of which was under ewe hogs, after having been two years bitten by grown sheep. Lastly to save the young lambs, the lambing was made as early as the climate permitted. The speaning was performed nearly a fortnight sooner than had been formerly practised, and the youngest and poorest lambs were sent at once to the best and most successful pasture, the more quickly to advance them to maturity.

By a vigilant attention to those measures the losses on the farm were reduced nearly one half, and the stock of every age exhibited a greater degree of health, and the sale lot more equality than the reporter or his people had in other circumstances seen.

To stimulate the shepherds to individual exertion, the reporter is in the practice of throwing out little premiums for competition among them, and he believes they do exert themselves very fairly. Nevertheless, there remains seven to eight per cent. annual loss on sheep lambed on the farm, and from ten to fifteen per cent. deficiency on what, from the number of ewes put to the tup, ought to be lambed against which he has not yet prevailed. Younger men will be found hereafter, who, possessed of greater science to arrange and skill to execute, will point out the errors of this day, as the present stock farmers smile at the folly of those who went before them, and who were content with the trifle which they realized from the cattle and Highland ponies that waded through the undrained bog and trampled it into mire.

In going more into detail of his management, he will first exhibit the manner in which his flocks now possess his farm, and then, beginning with the lamb when *unhived* at speaning time, he will show how each sort of sheep is with him treated from that time until it go to market.

In this year (1830, 1831) Nos. 1, 7, 8, and 4 are under ewes: Morvich and the north side of No. 2 in ewe hogs; Culmaily in wedder hogs, 3 and part of 9 in yill gimmers.* South side of 2

* The packs have marks totally different from the flock, and their faces have no brand or burn mark. The master keeps the shepherds' accounts, and balances them by double entry: if he do his duty, deception cannot take place. So many checks arise out of the system that he would quickly discover any thing wrong. They are a well-paid, and generally, almost universally, an honest, trustworthy class of people.

* Ewe hogs once shorn.

and 6 in dinmants,* and 5 and part of 9 in wedders; Morvich at the same time keeping the small end of the sale ewes and the ewes selected for breeding tups; Culmaily the small end of the sale wethers and the tup hirsel, and reserve being kept as follow:—In Culmaily for any wether sheep diseased; Morvich for ewe sheep diseased; the felspar land of No. 2 for sheep pined on the west side of the Naver, and that of No. 6 for sheep pined on the east side of that river. When the cotton-grass flowers in March, the following shifts will take place:—Morvich ewe hogs give place to the sale ewe lot from 7 and part of 8, which are then brought in to lamb, and consequently, to spean early, and prepare themselves to travel south. The wether hogs in Culmaily give place to a limited number of the small end of the sale wethers, which make greater progress there than on the mountain land, and thus prepare themselves for their further destination.

Speaning.—Then to begin with the lambs. At speaning (weaning) time, which happens in the sale ewe hirsel about the 11th, and in the keeping flocks about the 18th of July, the lambs are found with the marks which had been put upon them at cutting time in April and May, and which consist of the ear marks of the owners and the figure or 'buist mark' of the hirsel. This figure on the pack sheep was reverted on the shoulder to facilitate after sortings.

The operation begins by gathering the flocks shedding off yell sheep (or those which have no lambs), and telling the numbers on hand. This generally occupies a day. The yell sheep being despatched to their proper places the ewes and lambs are committed to their ewe herds who watch them during the short nights of this season. By daylight next morning, the flock is folded; by seven, the lambs are separated from their mothers; the mothers sent off under their own shepherds to the barren ground where their milk is to be dried up, and the lambs left in three folds. The first contains wedder lambs, the second ewe lambs and the third packs. At this stage the men generally breakfast in the fold; immediately after which the wedder lambs are divided into three sorts called tups, mids, and paleys. The tups are branded with a hot iron, buisted with a distinguishing tar mark, and, under charge of the second wedder hog herd, despatched to a tract of coarse pasture along the banks of numerous little burns (on 5 and 6) which fall into Loch Laygal, there to be tended until the middle of September. The mids are in like manner branded and buisted, delivered to the third wedder hog herd, to be summered, until the middle of August, on No. 2, where several little burns fall into Badanloch; and the paleys (young weak and stunted lambs) are, under the charge of one of the principal men, sent directly to the hay-fog or aftermath, and other succulent food prepared for them at Culmaily. The ewe lambs are then sorted into three lots:—First, the paleys are chosen, branded, buisted and despatched straightway to the hay-fog prepared for them on Morvich. Secondly, the worst-bred lambs are despatched to the outskirts of the wedder herding, intended to be in that year shifted to hogs. And, thirdly, the tops (the most choice and best breed) possess the outskirts of the ewe herding, to be in that year shifted to hogs. The packs, or shepherds' lambs, are divided into two sorts, sellers and keepers: the first, being *heeled* or marked with red chalk, are delivered to the buyers, or put into an inclosure to wait their arrival; the second are divided among the flock lamb hirsels. This concludes the speaning.

Wedders.—When the small wedder lambs reach Culmaily, generally to the amount of fifteen to twenty scores, they are, after a few days' rest on the sandstone mountain, minutely examined, any lame ones dressed, the weakest portion put into the hay-fog, then about three weeks old, and the rest admitted to the sweetest of the mountain-grass. About the 12th August the sale wedders are delivered, and the mid lambs from No. 2, and the best of the paleys, are admitted to their place. By the 12th September the rape is ready for use: the lambs, then paley, are sent to five hours' rape and nineteen of heather in the day and night. The mids are admitted to the place formerly possessed by the paleys, and the tops from No. 5 and 6 to the former position of the mids. In this posture the lots remain until about the 15th October: the early turnips being now fit for use, nets are set up across the tops of each of three fields, a lot smeared* into each, and five hours' turnips to nineteen of heather† allowed for the rest of the season. With March comes the cotton-grass flower; what turnips remain are then mostly consumed by cattle, and such of the wedder hogs as are fit to face the blast proceed to Strathnaver—the best lot by the first week of March, the next about the third week of March and the worst about the 1st April: one or two scores may be unfit to go sooner than Whitsunday.

It is observed at speaning-time that the paleys consist of two sorts, *viz.*, first, well-bred lambs, which, by reason of being very young, or twins, or badly fed by their mothers, or some other misfortune, are much under size; and, secondly, ill-bred lambs, marked by a *tendency* to short, stubby faces, broad bumpy wiry brows, flat ribs, sharp shoulder-top, round gurning-bones, and twisted legs. When the spring sortings take place, the well-bred mids and paleys are generally found to have advanced themselves to the tops; the ill-bred sheep have as certainly sunk to the bottom, and the last one or two scores which, with equal or superior feeding, lie on hand until Whitsunday, are nearly altogether composed of that sort of stuff.

And here the writer cannot help anticipating an observation, which perhaps would have come in better further on—that the difference in expense of keep, loss by death, and of ultimate profit, in favor of well-bred and against ill-bred stock, is so great and striking on a sheep farm, that the apathy of many stockmasters to the subject is incredible. The reporter and his leading men, year after year, have observed the lamb of a bad ewe a mid or paley—the same lamb unfit to go out in spring—the same beast brought in to make up for sale in its last year—and after all this extra expense, sold as a shott, at twenty per cent. under

* Wedder hogs once shorn.

* The smearing is an application of salve composed of butter or oil mixed with tar, turpentine, or some other substance, to the root of the wool, for the purposes of killing vermin, protecting from wet, and increasing the softness and the growth of wool.

† There is a waste of manure dropped on the heather land, but no remedy for this is known that is consistent with the health and hardihood of the young stock.

the price of the lot, merely on account of the base blood which flowed in its veins.

When the month of June has brought its interminable day, the wedder hogs yield their first fleece. They are then called dinmants; are sent back to the deer hair; and when it fails in August, and the sale wedders have gone south, they are sorted into their wedder herdings, to replace the waygone lot of the last year's ewe hogs; and after two years' stay there, they travel, in their turn, to the feeder.

Ewes.—The ewe lamb follows a course somewhat different from the wedder. At the delivery of the sale sheep, it falls into the finest grass on its herding—the paleys in Morvich—the worst bred full-grown lambs in the wedder herding—and the choice lambs in the ewe herding, made vacant by the cast of the sale sheep. The intention of this arrangement is, that the keeping lambs may, as far as possible, be at once hailed to that herding where they are to be settled as ewes; the deaths, &c. be beaten up from the best bred of the second chosen lambs and paleys; and those least fit for breeding be yelled off for sale—the smallest in the ewe herdings, by being protected by means of a contrivance called "brecks,,"* and the largest and strongest by being sent to the herding No. 3, which abounds in those plants best calculated to give increase of bone.

The contrivance of yelling or breeching a certain number of ewes in each herding, besides the advantage it offers in the improvement of the breed, answers an excellent purpose at lambing-time; for the yell ewes being all sorted off the herding a few days before the lambing begins, a greater abundance of feed is left to bring milk on the ewes, and thereby to put layer on their lambs—an article which it becomes the policy of the store-farmer never, if he can, to lose until he quit the sheep to the feeder.

These ewe flocks are tended, as formerly explained, in three double herdings, and one smaller or single herding; and it was also observed, that one of these double herdings is cleared out annually, to receive the choice or keeping ewe lambs. The single herding yields a third of its number annually, and receives from the second lot of ewe hogs its proportion of young stock. By this contrivance, the ewes can be sorted into three kinds: what approaches to tenderness is sorted down to the single herding, No. 8; what is open in the staple, or inclined to be pinny in the fleece, are hailed below the double shepherd's house; what is bad skinned, above it. By keeling, or marking with red chalk, the hardiest tups to No. 8, the saddest skinned to the under end, and the loftiest and most open skinned, to the upper end of the double herding, the whole flocks are kept in that medium, betwixt the two extremes, which every store-farmer knows to be essential to good farming, and to the sale of that quality of stock and wool that brings the greatest *sum* of money out of the market.

Tups.—In treating of the wedder sheep, allusion was made to the necessity of possessing well-bred Cheviot sheep: this, in the writer's very humble opinion, is a condition absolutely required for the purpose of realizing the greatest possible value from Sutherland mountain ground.

The reporter has seen tups very showy to look at from a distance, and full of wool; but on approaching them more nearly, the observer must have been struck, with how the feet were quite under the carcass, the breast and twist much narrower than to all appearance was compatible with so broad a carcass; with a hollowness or flatness betwixt the eyes, some bristly hairs on the forehead, and very likely an offer to produce a stubby horn; of which the point, like a small nipple, is just discernible where that ornament grows on horned sheep; and, on the whole, the head turns out to be larger than at first sight it was thought to be. Touch him, and you will find a flat neck, narrow hard shoulder, small tail, flat rib, and the back, where the ribs strike out, hard as a deal board; he has very little layer or wool along the back, but (if in condition) exhibits a mass of grease and wool mid-way down the rib; while he will clip at a show from ten to fifteen pounds of wool, of the quality of hemp. This class of sheep is the parent of shotts; his progeny will pay nothing to the breeder, feeder, or butcher, compared with the truly bred Cheviot sheep.

Upon which then these three questions arise—Where is this truly bred Cheviot sheep to be found? How chosen? And how shall his blood be best infused into the flock? These are questions which the reporter will answer with diffidence, being conscious that many breeders are much more capable than himself to answer them satisfactorily. Still the Society having done him the honor to call for *his* report, he will send his opinion and his practice together, and will feel too happy to have them amended in any particular.

1.—The breed of Cheviot sheep from which he has chosen, and would again choose his stock (were that to do), feed on the Scotch side of the Cheviot hills, and along the tract of high and stony moorland farms which stretches out betwixt that mountain range and the source of the Teviot: on the English side there has been, generally speaking, too much of Dishley blood applied, to have left in the animal the thrift, courage, and constitution necessary for the wastes of the county of Sutherland. West of the Teviot, again, it is within the memory of man since the stock was crossed in, from the *ovis aries rustica*, or black-faced sheep—a cross, of which the first is the best, as is the case in all crosses betwixt animals so entirely different from each other.

The spirited farmers of the western district have, for many years, been importers of tups from the east border; and the circumstance has not, perhaps, in every case, been favorable to the flock from which the importation was made. When this trade began, the west-country breeders fancied sheep with very fine bare heads, flat clean bones, and a short fine fleece, to counteract, as quickly as possible, the opposite qualities of their own flocks. In order to suit the market, the tup-breeders preserved only the finest of their young store. But the west border gentlemen had not gone through many generations, when they found that the cross had been too quick: a reaction followed, and, to the surprise of the tup-sellers, the top was turned to the bottom, the bottom to the top of the fair, and nothing could be sold but tups of coarse quality. The tup-breeders turned with the tide—a few to

* A piece of coarse cloth sowed on across the root of the tail, and about six inches down each hip on either side of the tail.

an extreme degree; many stopped short at the *certos denique fines*, where good management ends: and, certainly, the right stuff, and the most beautiful specimens of well-bred Cheviots, are only to be found in this quarter.

II.—As to the choice of a tup. After Mr. George Culley's description, which is in the hands of every breeder*, it would be presumptuous in the writer of this report to say more on that subject than respectfully to point out the shades of difference betwixt Mr. Culley's picture and the quality thought to be suitable to the county of Sutherland.

1st. His head ought not to be so very fine and small, but the nose should be full and aquiline from the tip (where the orifice is jet black) to the forehead. The brow should be inclined to be long and narrow, covered with short, white †, flat-growing, swirling hair. This cover ought to begin at the tip and extend over the whole head to the back of the crown, *close* behind the ear, where it is cut off at once by the circle of clean, soft, thick-set, and rather boardy wool, which terminates the fleece.

2d. The junction of the neck to the head must not be so very fine, nor the top of the shoulder too broad, but a rapid increase of strength from the top of the neck to the withers or junction of the shoulders; the top of the shoulder ought to be to the touch, as if the flesh on the chin overtopped the shoulder. This flesh or layer should be deep in quality and well covered with close-set wool, to cover the back broadly and effectually to the cleaving on the tail head, where the spine terminates in a broad tail, set on so low that the eye, in returning along the back, fancies there is a gradual rise from the tail to the neck, and a little swell on the loin.

3d. The skin ought to be by no means thin, and the wool should be thickly planted on it, fine, soft, slightly inclined to be boardy, hanging together in regular staples from root to surface, elastic to the gripe, and covering the belly, and also the quarters as far as the mutton extends; at the termination of which it is cut off at once by the clean white hair that covers the legs.

The whole animal exhibiting greater strength, daring, and agility, than Mr. Culley's description brings before the mind.

III. In breeding tups, the general practice in the highlands, after selecting the tups thought to be the best, is to shed off from each hirsel of ewes a certain number of what are considered the "truest," and most perfectly formed; to put one tup to each lot so shed off, and set apart; to bid the shepherd tend this lot during the "riding" season separate from the rest of the flock, and from the produce to select tup lambs. It many years ago occurred to the writer, that in this method there were many defects: first, the separation intended was not effectually maintained—during the long moonlight nights of November and December the ewes got back to their accustomed haiff, and the tups mingled in the flock;—secondly, it caused a great additional disturbance to the flock, both at riding-time, and at the subsequent lambing, cutting, clipping, and speaning, to say nothing of the loss occasioned by the fox, eagle, cat, martin, raven, &c., all of which could be more cheaply fed in some other way than on tup lambs;—thirdly, in the course of his observation it occurred to him that a great proportion of the ewes so set apart in the several hirsels formed no proper cross to the tup employed in that particular hirsel, but possessed a tendency to the same defects, and to the same perfections possibly with the tups; consequently, the defects on both sides were aggravated, and the very perfections, by increasing to excess, became defects;—and, lastly, as all breeders know that animals in very many cases, and especially where crossing has taken place, breed back not to the immediate parents, but possibly to the great-great-grand-dam or sire; it must follow that, without a particular genealogy of tup and ewe, the object intended to be effected by any particular union will often turn out contrary to the wishes and expectations of the master. It was resolved to make a careful selection from the *élite* of particular families in his own flock; to purchase, at whatever expense, a few of the *élite* of certain ancient and well-bred flocks in the east border; to form them into one "selected hirsel" for the breeding of tups; to place them under his own immediate notice, to study the particular tendency of each family towards a deficiency or excess in each particular "point?" by judicious crosses betwixt the various families to produce stock more perfect than either dam or sire; and through this stock to infuse the best border blood into his flocks. The experiment wrought like a charm, and in a few years it lifted up the reporter's stock to a new position, both at the tup shows, and, what is more to the purpose, in the market where the stock and wool are annually sold.

The most choice lots of the county of Sutherland wool and sheep are generally sold in the "great annual market," held at Inverness, in the second week of July. At this market farmers assemble from all parts of the highlands; they are met by wool-staplers and sheep-buyers from the south of Scotland and from Yorkshire, and transactions to a very great amount take place without show of stock or sample, resting entirely on the character held in the market by the owner and his goods; and it is very seldom that one

* Mr. Culley's description of the ram:—'His head should be fine and small, his nostrils wide and expanded his eyes prominent and rather bold or daring, ears thin, his collar full from the breast and shoulders, but tapering gradually all the way to where the head and neck join, which should be very fine and graceful, being perfectly free from any coarse leather hanging down; the shoulders broad and full, which must, at the same time, join so easy to the collar forward and chin backward as to leave not the least hollow in either place; the mutton upon his arm or forethigh must come quite to the knee; his legs upright, with a clean, fine bone, being equally clear from superfluous skin and coarse hairy wool from the knee and hough downward; the breast broad and well formed which which will keep his forelegs at a proper wideness; his girth, or chest, full and deep, and instead of a hollow behind the shoulders, that part, by some called the fore-flank, should be quite full; the back and loins broad, flat, and strait from the waist; the ribs must rise with a fine circular arch; his belly straight; the quarters long and full, with the mutton quite down to the hough, which should neither stand in nor out; his twist deep, wide, and full, which, with the broad breast, will keep his four legs open and upright; the whole body covered with a thin felt, and that with fine, bright, soft wool.—*Culley on Live Stock*, p. 103 and 104.

† Many very excellent Cheviot sheep have a gray color on the nose, which gets darker near the tip. Others have a slight tinge of lemon color on the face.

hears of a disappointment occurring to buyer or seller. The market is advertised to take place on Thursday, and the business certainly might be despatched in one day; but gentlemen who find themselves removed for a time from residences which, though comfortable and beautiful, are yet solitary, when congregated with the brethren of their profession, under agreeable circumstances, can seldom be induced to separate before the conclusion of the week. The weekly steemers betwixt Inverness and the Forth and Clyde, and the daily coaches betwixt the same city, Edinburgh, Aberdeen, and Glasgow, afford such facilities, that an English farmer, by embarking at Yarmouth or Sunderland on the east coast, or at Liverpool on the west, might attend this market at the expense of one fortnight's absence from his home.

Accounts.—The farm accounts are kept in the most simple form possible, by journal and ledger, checked by double entry, vouched by the steward's reports and other documents, and abbreviated by five waste-books. The waste-books, consisting of a corn-book, cash-book, sheep-book, time bill-book, and memorandum of statements with work-people, are carried on from week to week throughout the year, and at its termination the whole posted from these through the journal into the ledger, which is shut by a balance account on the 1st January yearly. Farmer's books are not such agreeable companions now, as they were before the battle of Waterloo; nevertheless, a wise man will keep them correctly, and balance them punctually; recollecting that it is in the rout, not the fight, that the carnage takes place, and that that party is safest which shows the most correct front to the enemy. When a farmer's accounts betray confusion or sloth, his servants become indifferent to their duty; faithful servants quit, worse men take their places, and pillage begins. A rogue is shy to engage with a master who pays punctually and liberally, with a professed intention fearlessly to send a thief to justice. He waits for a place of a contrary description, and there he exercises his vocation.

Capital.—According to the best opinion which the reporter can form, the capital necessary to enable a farmer to carry on business in Sutherland may be stated at about four pounds, to four pounds ten shillings per tillage acre, and twenty shillings for each sheep. A Scotch farmer, however, under a decent landlord, may venture farther than would be safe in other circumstances, in consequence of the landlord's right of hypothec, or preference established by Scotch law over the whole produce of the farm in security of his rent. This right of preference exists, tacitly, over each crop for the rent of that crop, and over all stock until three months after the last conventional term of payment. Suppose a tenant's rent payable, by equal portions, at Martinmas 1829, and Whitsuntide 1830, for crop and year 1829. At Martinmas, markets for corn, and, at Whitsuntide, markets for stock, are ruinously bad, in consequence of the glut caused at these seasons by the distress of the English farmer. The Scotch landlord *knowing the perfect nature of his security* scruples not, in such circumstances, to give his tenant whatever indulgence is necessary for the fair conversion of his produce into money. The difference of five, ten, fifteen, or twenty per cent. on the gross sales of his farm is an important one. Neither is such an exercise of the landlord's right attended by any bad consequences to society; diminishing, in the first place, the glut of markets at term time, it slackens at another season the gripe of the forestaller, and softens the monopoly which he would otherwise be possessed of; secondly, the dealer who buys farm produce, knowing perfectly the *public law of the land*, feels himself at liberty, before settling with the tenant, to say, "I presume your rent is paid?" The answer from the most necessitous man is, "Indeed, sir, it is not, but here is a letter from my landlord or his agent, to say that you may pay me 50*l.* on account, and for the balance, he and I will grant a receipt in full." By a judicious exercise of this right of hypothec during the late difficult years, thousands of Scotch farmers have been saved from ruin; and men are now prosperously conducting the operations of a farm who, in other circumstances, must have sunk under the pressure of those times which have overwhelmed so many of their brethren in the south.

Those who disapprove of the right of hypothec say, "Let the tenant find personal security to the landlord, if he cannot pay on term day; or let the landlord at once take an execution for his rent." But it is submitted that it would not be wise to recommend the substitution of an execution for the existence of the landlord's *tacit* right of hypothec; and with respect to security, where is he to find it, but among persons in circumstances similar to his own, to whom and with whose friends he must join in obligations of the same nature? In the extent and uncertainty of his engagements his head turns, he plunges into one or more of the fatal circles which from three months to three months revolve round the banker's counting-house; and after increasing to the best of his ability, the revenue derived from the "Excise," and thereby proving the "prosperity" of the country, down he comes.

Poor.—Another instance of Scotch feeling the reporter will notice, as it exist among a different class—the cotter or agricultural laborer—that is, with respect to poor-rates. The English, the bravest and most generous people in the world, have established them; and yet it is not said that they are any where so established, unattended by a considerable degree of improvidence and dissipation among the parties in behalf of whom the provision is made.

On the demesnes of which these farms are a portion, with a more dense population than ever existed there at any former period of time*, there are no tithes, no poor-rates, and—no drunkards, or beggers; positively few or none, besides the Irish, and the few squalid, ruined men from the south, who wander occasionally into the country. Nay, one meets with few peasants' sons, of this district, who have not, from such slender wages as this report speaks to, been taught to read, write, and, perhaps, to cast up an account. If a tolerable proficient, away he goes to "seek his fortune;" and the proverb says, "it is a bare moor but he will find a cowe † upon it." Go where he may, his heart is with his father's house; and if he succeeds in life, which he generally does to a certain extent, the "inmates" there are the better for it. The first feeling of a Scotch peasant is affec-

* Vide census, 1811, 1821, 1831.
† Cowe, a bit of heather.

tion for his kindred; the second is his sense of *their mutual* but sole dependence, under Providence, on industry and thrift, to save them from the shame of beggary. The parent wrestles hard to push forward some part of his family by dint of education: the child, unknown to any.

'deposits his sair won penny fee,
To help his parents dear, should they in hardship be.'

By reciprocal good offices, by joint industry, sobriety, and produce, they get on wonderfully. In sickness they apply at the nearest house where any medicine or comfort is likely to be obtained for their friend in distress; they seem to expect it as a debt, or rather a loan, due from one Christian to another: but for the least drop of honey, jelly, wine, or even vinegar obtained there is a visit from the patient, as soon as he can crawl abroad, with a thousand thanks, and a fowl, some eggs, or the like; which how to refuse or to pay for without offence it requires some tact to discover.

On entering the habitation of the cotter, his fare is found to be very simple. In summer, oatmeal porridge with milk for breakfast, potatoes for dinner, and bread and milk or something similar for supper. In winter, porridge, with perhaps a little bit of butter or some treacle, to breakfast; potatoes mashed, cut into slices, and done on the gridiron, and eaten with a very little fish, pork, or a bit of cheese to dinner, and gruel with a few potatoes ar a bit of oaten or barley bread to supper. His abstinence is nearly complete from tea, coffee, sugar, candles, soap, ale, parliament whisky,* and every taxed commodity, except tobacco; and the nature of the climate has rendered it one of the necessaries of his life.

To a greater share of the comforts of life, the agricultural working man and his family may, doubtless, be admitted, and are so daily; but prudence and care and moral conduct continue, and it is hoped will long continue, to characterize this simple, industrious, and virtuous class of men.

PATRICK SELLAR.

Morvich, 6th January, 1831.

A GENERAL DESCRIPTION OF THE APPARATUS FOR CARRYING INTO EFFECT THE FORCING SYSTEM OF VENTILATING COCOONERIES, INVENTED BY D'ARCET.

[Several years have passed since we met with some general notices, in a French periodical, of M. D'Arcet's plan of ventilation for cocooneries, and of its admirable success in the practice of M. Camille Beauvais, in the very unfavorable climate of the vicinity of Paris. One of these articles was published in a former volume of the Farmers' Register. But still nothing was stated of particulars. We attempted to procure the full plan, as first published, from France; but, like many other such efforts, in vain. At last, it has been obtained for, and published in, the 'Silk Grower,' and we hasten to lay the article before our readers. The successful and interesting results of the earliest experiment on this plan (though very imperfectly executed,) by Messrs. Cheneys, were published in our No. 12, of the last volume.

Highly as we estimate the value of this "artificial system," which subjects, almost entirely, the weather and atmosphere to the control of man, and though we believe it will be found to be the cheaper and better mode in regular establishments on a great scale of operations, yet we by no means recommend it for any other. The natural temperature and ordinary seasons of Virginia are sufficiently good for a high degree of success and profit in silk-culture; and in feeding-rooms of moderate size, where sufficient space and change of air are secured, nothing more than the natural air and temperature is essential, though doubtless a little fire in cool and damp spells would be economical, as well as very beneficial to the vigor of the worms. But though no expensive fixtures or scientific processes and rules are necessary for success, and still less for beginners, it will not be less interesting to know what art and science have done, and can do, in overcoming every natural defect of climate, and source of disease and loss in the feeding insects.—ED. F. R.]

From the American Silk Grower.

[The system of rearing silk-worms, recently matured in France by Beauvais and D'Arcet, shows the devices to which the climate of that country makes it necessary to resort in order to insure success. In publishing the description of it, we think it proper to state that we do not, by any means, consider the whole of the arrangements described, required in our superior climate. A perusal of the details may, however, afford some valuable suggestions to those possessing cocooneries or intending to erect them. Silk-worms undoubtedly succeed best when kept at a uniform and pretty high temperature, say about 74° Fahrenheit, and times occur, even in our climate, when the natural heat of the atmosphere, especially of mornings and evenings, falls lower than is desirable. Under these circumstances it is very advantageous to have some convenient mode of diffusing heat through the cocoonery, for which purpose a furnace and air-chamber may be established in the basement or cellar beneath, either directly in the middle, or at one side or end with flues conducted under the floor, in which apertures may be made at suitable distances to let the warm air into the apartment. This may be effected without recourse to that multitude of holes recommended by D'Arcet, the sizes of which are regulated upon mathematical principles. In an apartment 25 or 30 feet long, eight or ten holes, of moderate size, may suffice. Instead of holes and flues above to lead off the air into a chimney, we would allow the warm air to rise, as it naturally will, into the garret, and then escape through apertures or ventilators in the roof. We prefer cocooneries one story high.—*Ed. Am. Silk Grower.*]

The great profits afforded by the silk culture in the southern provinces of France as well as in other places, had led to repeated attempts to intro-

* Within these few years, illicit distillation has almost entirely disappeared, and the character of those that dealt in it has proportionally improved.

duce this branch of agriculture into the northern and central departments. These trials were continued through a long succession of years, but generally proved unsuccessful. Recently, however, Camille Beauvais, either from possessing more perseverance than his predecessors, or being more capable of forming a just appreciation of the influences of climate, has succeeded in establishing the culture of the mulberry and the rearing of silkworms in the vicinity of Paris. The important improvements introduced by him have powerfully contributed to the success of this branch of industry, and are therefore well worth the attention of those interested in the silk culture.

To remedy the defects of climate upon silkworms, protect them from the ordinary sudden vicissitudes of weather, and place them under atmospheric conditions most favorable to their health and developement, were the first objects of his researches. In pursuit of these ends he applied to Claude Dumont, who furnished him with the means of regulating the entrance and escape of air into the cocoonery. Peclat soon afterwards suggested modifications which were of great advantage, and, finally, he had the happiness to find a new assistant in D'Arcet, who, applying science to observation, succeeded in maturing a complete *plan of a salubrious cocoonery, by means of which the proper degrees of ventilation, temperature and moisture, necessary to insure successful rearing can always be obtained.*

The magnanery, or cocoonery, described by D'Arcet, in which this ingenious system is carried into effect, is at Villemonble near Paris, and was erected by the government architect, Destailleurs, for De Grimaudet. It has two wings, both uniform, and each about 150 feet long by 50 wide. The lower or basement story is appropriated as a filature or reeling apartment, and place for drying leaves. It has pillars along the centre for the support of the floor above; at one end of this apartment, and through its whole width, a portion is cut off (see fig. 3) serving as a chamber for warm or cool air, and from this the ventilation of the whole cocoonery is effected. The air chamber is supplied with a furnace (4) the flue of which terminates in the main chimney (21.)

It is in this portion of the basement that the heating and cooling, together with the general means of ventilation are effected. The remainder of the story (M) is appropriated to the drying of leaves when these have been gathered in a moist state, and for reeling cocoons according to the method of Gensoul, after the completion of the feeding.

The apartment (O) immediately above the basement is devoted exclusively to the rearing of worms. It has four flues, or conductors, made of wood running under the floor lengthwise, (the commencement of which are seen at plates 1, 2, fig. 14.) Through these the air, after being properly warmed or cooled, in the air chamber, (3) is conducted into the cocoonery. Above these flues are placed the hurdles (8.) The apertures (15) through which the air passes into the cocoonery are of unequal size, each flue has sixty, of which the first that receives the air is only about an inch square, the size of the others increasing in arithmetical proportion as they recede from the air-chamber. The sum of the superficies of the sixty holes, amounts to 0,198 of a square metre, (the square metre being equal to 1,196 square yards.)

The vitiated air of the cocoonery is drawn off by means of four flues (plate 2, figs. 20) placed above, with apertures (19) opening into them. In form and arrangement these flues and apertures correspond with those below for introducing the air.

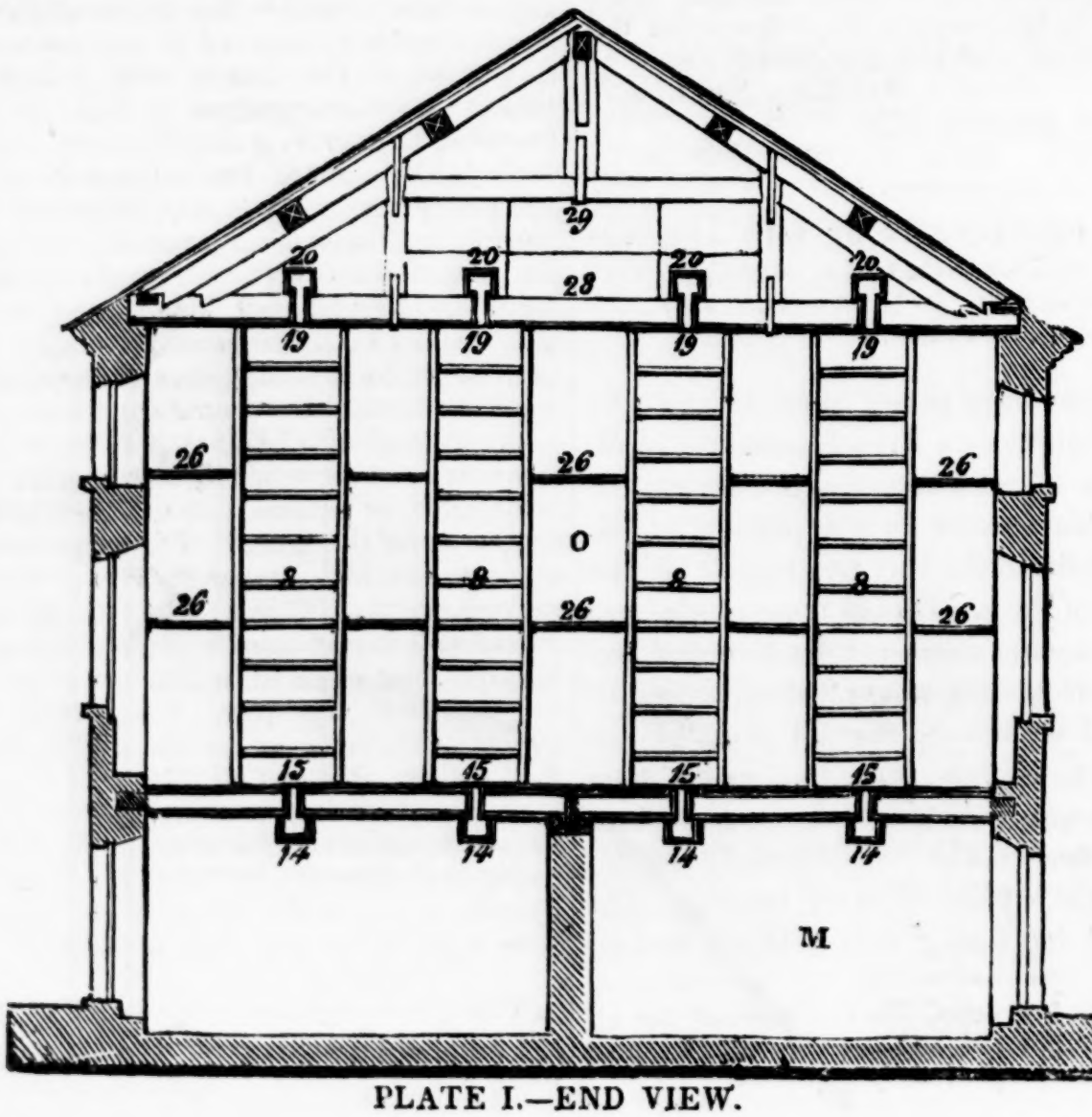
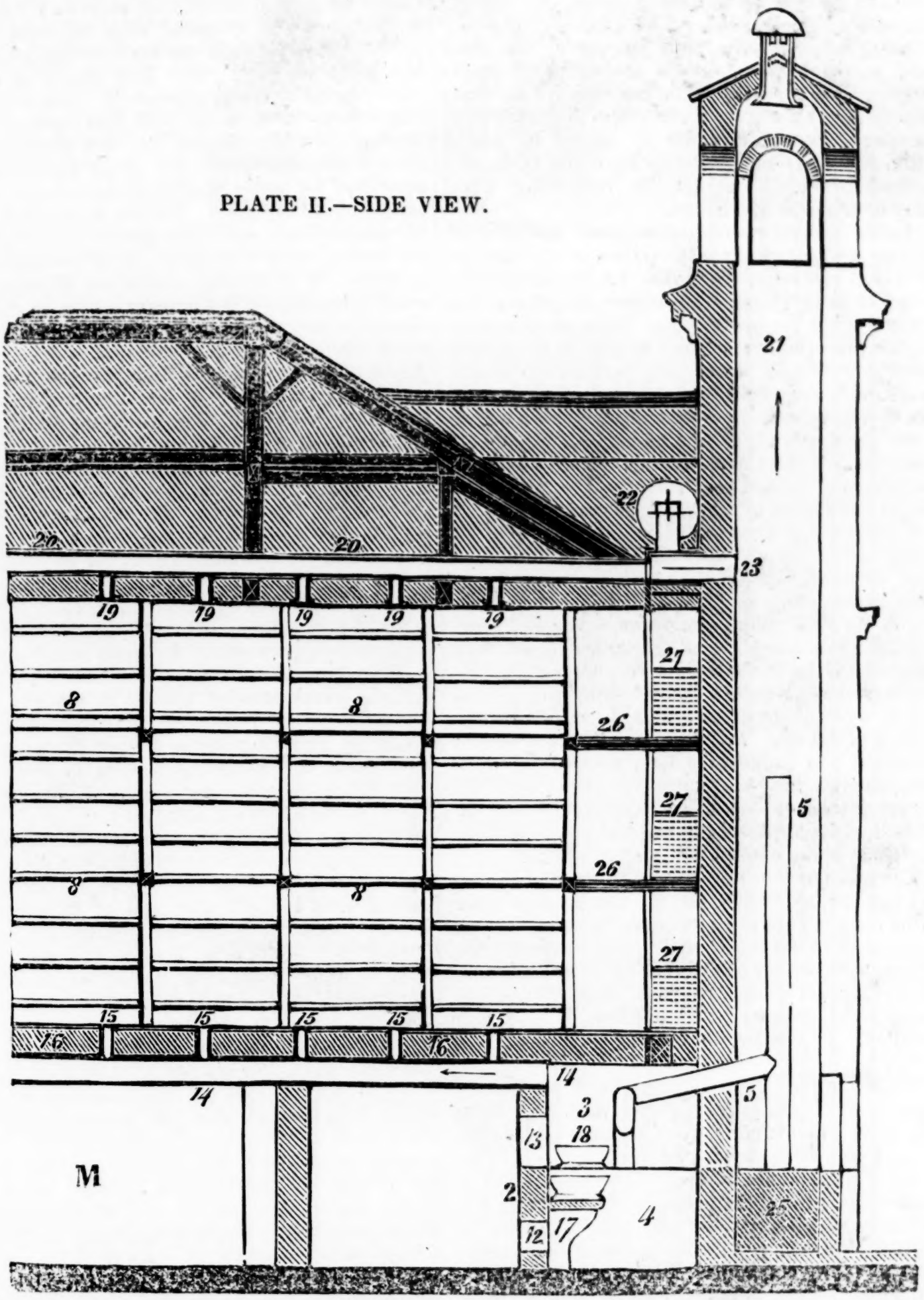


PLATE I.—END VIEW.

PLATE II.—SIDE VIEW.



The upper flues are made to unite into one box, previous to entering the main chimney (21,) this box is furnished with a ventilating wheel, *(tarare)* (22) and its size, as well as that of its opening into the chimney (23,) is five times greater than that of either of the flues.

The air from the cocoonery may be conducted at pleasure either immediately into the main chimney (21) or by way of the ventilating wheel into the garret. By closing the register (23) and thus cutting off the direct communication with the chimney, the ventilating wheel is made to draw the air from the cocoonery and force it outside through apertures in the garret with greater or less rapidity.

The size of the main ventilating chimney (21) should be equal to double the capacity of the four flues. Ventilating flues may, if necessary, be constructed upon economical principles, the cracks in the wood being closed by means of coarse paper or cloth coated with glue. In constructing a new cocoonery, the flues may be advantageously established in the space between the floor and ceiling.

At the bottom of the main chimney there is a furnace *(fourneau d'appel)* (25) specially appropriated to the purpose of creating and increasing the draught. The pipe (5) from this is

conducted into one leading from the furnace constructed for heating the air-chamber, the draught furnace at the bottom of the chimney, and ventilating wheel above, both operate to the same end, namely, that of always producing the proper degree of ventilation in the cocoonery. In cases where the external air is too warm and it becomes necessary to cool it down by means of ice, or otherwise, before introducing it into the apartment containing the silk-worms, the ventilating wheel may be brought into action.

In his general considerations upon the adoption of this plan for artificial ventilation in cocooneries, D'Arcet observes:—If there be an established principle in Hygiene, it is above all others that which makes the breathing of fresh air necessary for the preservation of good health in animals of every description. Intelligent persons are unanimous in their opinion upon this point. The subject therefore needs no farther discussion in regard to the main principle, and its applicability to cocooneries. The only remaining question is as to the choice of means best calculated to effect the proper ventilation in such establishments.

Upon reading what has been published upon the subject of rearing silk-worms in China, we find that from the earliest periods the Chinese have recognised the necessity of preserving the greatest purity in the air of their cocooneries. We are, however, obliged to acknowledge that the means they adopted for this purpose were very imperfect. To renew the air of a cocoonery by opening to a greater or less extent its windows and doors, shows the infancy of the art. Its effects are to renew the air unequally; to produce sudden changes of temperature with irregular currents, annoying to the worms nearest the openings, and insufficient for those situated farthest from the doors and windows as well as in the corners of the apartment.

The deficiency of scientific knowledge in China, its immense population and the low price of labor in the country, are circumstances which afford an explanation of the imperfection which exists in the means employed for the ventilation of cocooneries, and the success of their rearing. But this success is only to be attained at the expense of time and attention. In France we may and we should do better.

Whilst engaged in applying means for the restoration of health to cocooneries that had been long in use, I ascertained how very rapidly the air became vitiated in those apartments where a large quantity of ammonia formed and accumulated. I therefore saw the great necessity of contriving the means by which a regular and active ventilation might be effected, and the air constantly maintained in a healthy condition. The system of ventilation which I have described in my memoir upon healthy cocooneries, has appeared to me the most convenient for adoption, because it spreads the current of air through the apartment evenly and slowly; it is at the same time simple and economical, easy of application, admitting of every degree of quickness in the current of air, and, when necessary, of an instantaneous check. The plan has been in use for three years, and has perfectly answered my expectations. The extensive correspondence which I have kept up in relation to the subject has afforded the most positive evidences, that the system, even when imperfectly applied, has been productive of the most happy results.

Some persons have thought that the plan of artificial or forced ventilation, such as I have described, must be attended with injurious effects upon the health of silk-worms in consequence of its too great violence. But this charge is wholly contradicted by the experience of three years, during which time, in all that has been said and written upon the subject, not one objection has been made against the too great rapidity of the current of air in the salubrious cocooneries erected according to my plan. On the contrary, I have been questioned, especially by the silk culturists of the south, upon the propriety of increasing the power of the ventilating apparatus, a thing most readily accomplished wherever it may be required; since it is only necessary to raise the height of the main chimney, increase the size and velocity of the ventilating wheel, and employ the means of ventilation with more or less force, according to the atmospheric conditions which may exist.

The forcing system of ventilation applied to cocooneries has for its principal object the withdrawal of vitiated air from apartments, and the gradual substitution of pure air. But its advantages are not limited to preserving the health of the silk-worms and persons employed in the cocoonery.

It is recognized as a principle, the truth of which has been confirmed by actual experience, that it is easier to raise than to cool down the temperature of the ventilating current. In some situations and under certain circumstances, it is necessary to reduce the temperature of the air, in order to effect the most proper ventilation in cocooneries, and obtain the greatest possible product from the rearing. Now the foregoing system of ventilation offers the most convenient means of effecting this object, in the following manner.

When the ventilating current introduced into an apartment is not saturated with watery vapor, it is evident that its temperature will be lowered by coming into contact with wet or moist bodies. When, therefore, it becomes necessary to cool down the temperature of the air, and when this must be done without the use of ice, it may be conveniently effected by sprinkling water in the air chamber, and upon the floor of the cocoonery, or by suspending in this wet cloths. I will not farther dwell upon the employment of these means of which I have said so much in my memoir. But I will observe that silk-worms transpiring freely, and, together with the fresh leaves, being exposed on all sides to a current air, must necessarily have their temperature reduced below that of the surrounding air, a proper regulation of which cannot help being advantageous under the circumstances referred to. As to those persons employed in the cocoonery, and whose natural temperature is fixed above that of the air, the current refreshes them in the same manner that it does out of doors, on which account it will be equally beneficial to them as to the silk-worms. An application of these observations will tend greatly to establish the correctness of the preceding remarks.

Supposing that we had to superintend a rearing in the south of France, and that the air was to get into the calm and sultry condition which they term in those countries *touffe*. In this case if the cocoonery was not well ventilated there would be no means of checking the progress of infection and preventing the death of the silk-worms in the

apartment. If, on the contrary, the rearing was carried on in a cocoonery to which the system of artificial ventilation was properly adapted, the evils might be readily remedied in the following manner:

According to the observations of H. Bourdon, the air which has become *touffe*, has a high temperature, is stagnant and almost saturated with moisture. To restore the air to a healthy condition it is necessary either to remove a portion of the watery vapor which it contains, by lowering the temperature and producing a current, or otherwise by raising the temperature of the apartment a little higher and giving the necessary activity to the ventilation.

In preparing my memoir upon healthy cocooneries I had introduced a chapter describing the means adopted to give the current of air at all times the proper degree of moisture. But the fear of complicating the apparatus beyond what was essentially necessary, induced me to suppress this chapter. In the healthy cocooneries at present established, there are, therefore, no contrivances introduced for directly removing any excess of moisture from the circulating air. On the other hand, as neither the use of ice or the evaporation of water has been generally adopted, the means left for reducing the temperature of the current of air, are extremely inefficient. Under existing circumstances, it is therefore necessary, in order to guard against the sad effects of the *touffe*, to abandon the means first pointed out, and have recourse to those above described. Conformably to this, the temperature of the ventilating current must be raised some degrees to render it capable of evaporating an additional quantity of water and to increase the ventilation, to avoid the accumulation of vitiated air, as well as to revive the silk-worms and the leaves upon which they rest. By operating in this way, the desired objects, may probably be attained, and the inconvenience avoided of being obliged to multiply the number of feedings in proportion to the increased temperature given to the ventilating current, in order to obviate the disastrous effects of the *touffe*. As to the persons employed in the cocoonery, it is evident that they would experience less inconvenience from warm air circulating in a brisk current, than they would from the *touffe* out of doors, where the air, though not quite so warm would be stagnant and saturated with watery vapor.

By way of recapitulation, I will observe, that comparatively few of the advantages to be derived from the means recommended for the establishment of healthy cocooneries, have as yet been attained.

The means of cooling the ventilating current have been either neglected, or very imperfectly employed. The apparatus capable of carrying on the forcing system of ventilation in the north of France, has, in the south, proved insufficient for the purpose. The power of the apparatus must, therefore, be increased in warm countries, and, as has been already remarked, nothing is easier than to do this.

No direct means have as yet been used to diminish the quantity of watery vapor contained in the air when this becomes saturated. But every thing is ready to effect this object, if longer experience should show it to be indispensably necessary.

As to the plan of raising the heat of the too *humid* air, for the purpose of rendering it more salubrious by rendering it capable of taking up a fresh quantity of moisture, it also can scarcely be said to have had a fair trial.

Notwithstanding all these difficulties, inseparable from the adoption of a new process, in so many places and under such different circumstances, the very advantageous result obtained in well constructed healthy cocooneries, have given them a start and a progress which there is no danger of seeing arrested.

[The following additional remarks of M. D'Arcet are taken from the same publication.]

Since the publication of my first memoir upon the construction of healthy cocooneries, I have been charged with proposing the employment of plans too complex and expensive. I can readily believe that the apparatus which I have described will not be generally adopted without some opposition, and that to the objections already raised others will be added. But the success obtained in 1835, in Camille Beauvais' cocoonery, and the conviction that an old manufacturer, like myself, would propose no new process, which, when faithfully tried, would not be found both practicable and convenient, encourages me to look for ultimate success. Besides, when we consider that the taste for agriculture is spreading among the wealthy classes, that large capitals are already devoted to the developement of every branch of rural industry, and that the sciences are put in requisition to favor this happy impulse, are we not warranted in believing that the time has arrived when we can and should make every effort to raise the silk culture above that state of infancy in which it has been left since its introduction into Europe? I may observe that the object under consideration is not merely the production, at considerable expense, of an article of merchandise, commanding a low price, and that in this respect the case is entirely different from what we observe in most branches of productive industry. A well arranged cocoonery costs but little more than one of the kind usually put up. More attention is certainly required for its arrangement; but at the present day, when the march of improvement has made such rapid strides, this difficulty could only exist among those who had not kept up with the spirit of the age. As to the increase in the expenses of daily attendance during the rearing, can any one seriously raise this as an objection, who takes into consideration the great increase of the product both as to quantity and value? A negative answer will certainly be given when it is considered that the cocooneries of Europe, as ordinarily constructed and managed, yield on an average only fifty pounds of cocoons for each ounce of eggs, and that in an establishment well constructed and managed, the product should be at least threefold; that the average price of the reeled silk is 60 francs per kilogramme;—(about six dollars per pound,) and lastly, that France has now to import annually more than 40 millions of francs' worth of silk, which she might easily raise, and the surplus, if any, command a ready market in England, Russia, and the whole of the north of Europe, where the demand for silk stuffs is greatly increasing without the power of raising the raw material. These important considerations will, I trust, put an end to the charges

which have been brought against me, and I hope that the large proprietors will look upon the culture of silk as strictly connected with the manufacturing interests; that they will devote to it their capital and attention, and uniting in their efforts finally succeed in disengaging this branch of agricultural industry from the swaddlingcloths, in which it has so long been invested, and placing it upon the same high footing recently attained by the manufactures of soda, beet sugar, acids, and many other articles, the production of which chemistry has so rapidly brought to a degree of perfection, that, half a century ago, would have been regarded as chimerical.

EXPENSES AND PROCEEDS OF CROPS.

From the Farmers' Cabinet.

In my former communication I gave a concise account of the principal crops of the farm. I will now proceed to do the same with some of the minor ones, or such as do not enter into the regular rotation: and commence with—

Broom corn.—1 acre gravelly loam. Ploughed May 10th, then rolled and well harrowed, struck out the rows quite shallow, about four feet apart—put in four quarts seed with a drill, and ran over it with a light harrow to cover it well: Dressed it with the cultivator on the 14th, and again on the 19th June; finished tending it on the 30th, by throwing a light furrow to the corn, and passing the cultivator after the plough once in a row—bent it several times during August, to prevent the heads from spreading and becoming ill-shaped. Cut the whisks and secured them in the barn in October, afterwards cut the stalks and hauled them into the yard as litter; if the corn had been cut earlier, *perhaps* these might been worth preserving as fodder.

Broom Corn.

Dr.	
To plough half a day, - - -	$1 00
To harrowing three times, - - -	50
To drilling and seed, - - - - -	25
To tending, - - - - - -	2 00
To gathering, - - - - -	3 25
To making into brooms, - - -	6 00
	$13 00
Cr.	
By 16 dozen brooms, at 2$,50 per dozen,	$40 00
Deduct expenses, - - -	13 00
Balance, - - - -	27 00

Potatoes.—Three-fourths of an acre, gravelly loam, in corn the year previous. Hauled on twenty ox cart loads stable manure, and spread it evenly; ploughed it in the 21st of May, dropping the cuttings at a distance of nine inches apart, into every third furrow, then rolled the whole, harrowed them ten days after with the common harrow; ran the cultivator through them on 16th and 30th of June; gave them the last dressing with the plough on the 7th July. Gathered them the first week of November. The method practised was, to run a furrow directly along the row with a plough, followed by the pickers, then pass the cultivator over it, and lastly, the common harrow two or three times—the pickers getting all that appear at each going over; if careful, but few will be missed in this way, and it is much more expeditious than digging them with hand rakes. It required six bushels large seed potatoes, cut into pieces of one eye each, some time before planting, to allow them to dry. They should have been housed earlier in the season.

Potatoes.

Dr.	
To hauling manure one day, - -	$3 00
To twenty loads manure, at $1 per load,	20 00
To ploughing and planting, - -	3 00
To six bushels seed, at 50 cts. a bushel,	3 00
To tending, - - - - - -	1 00
To gathering, - - - - -	2 00
	$32 00
Cr.	
By fifty bushels potatoes, at 80 cents per bushel, - - - - - -	$40 00
Deduct expenses, - - -	32 00
Balance, - - - -	$ 8 00

Ruta bagas.—One acre clay loam, in corn the year previous. Hauled on twenty ox cart loads of barn yard manure, spread it evenly, ploughed it under, and harrowed the ground well about the middle of June. Let it lay until the middle of July, then threw it into ridges two feet and a half apart; put ten loads of compost in the trenches and covered it by splitting the ridges, and throwing a furrow on to it on each side, then rolled it and drilled in three quarters of a pound of seed. Owing to the dry weather they did not make their appearance for more than three weeks after the seed was deposited in the ground. The tending of this crop was not kept account of regularly.

Ruta Bagas.

Dr.	
To twenty loads manure, at $1 per load,	$20 00
To ten loads compost, - - -	10 00
To ploughing and harrowing one day,	2 00
To hauling and spreading manure, -	3 50
To putting in and seed, - - -	3 50
To tending and pulling, say - -	5 00
	$44 00
Cr.	
By 200 bushels Ruta Bagas, at 30 cts. per bushel, - - - - -	$60 00
Deduct expenses, - - -	44 00
	$16 00

Beets.—One-fourth of an acre sandy loam, in corn the previous year. May the 18th, hauled on four loads of barn yard manure,—spread it evenly and ploughed it under deeply and harrowed the piece well; then threw it into twenty inch ridges—put two loads of short well rotted manure in the trenches, and ridged over it again, smoothed and levelled the ridges with a rake, and dibbled in the seed by hand, five inches apart. Hoed them on the 11th and 19th of June; on the 25th, immediately after a rain, thinned them to ten inches apart, filling up vacancies with plants taken from where

they were too thick; hoed them the last time on the 13th July. Pulled them early in November. The rows were too contiguous, attempted once to dress the patch with the plough and cultivator, but gave it up as poor business. Thirty inches between the rows, would have allowed of their being dressed by horse, instead of manual power, and then perhaps they would not have suffered as they did, from want of the soil around them being kept open to the influence of the atmosphere. There were about thirty bushels of beets, the tops were used through the growing season as food for pigs.

CRANBERRIES.

From the Cultivator.

These excellent berries are gathered in abundance in the counties of Middlesex and Norfolk. We believe they are more plenty here than in any part of the commonwealth. We can hardly say they are cultivated, for they are the spontaneous growth of many of our poorest, wet meadows. Still we have no doubt they may be improved in size and multiplied in quantity by giving them a little attention.

In Concord, Lexington, Carlisle and other towns in Middlesex, these berries are gathered by means of a very simple and cheap rake, in which they are held until emptied into the basket which is carried for the purpose. And we have been told by some of the trustees of the Middlesex Society, at one of our meetings, that 60 bushels of cranberries had been gathered by one man in a single day.

The vines of the cranberry are not injured by raking, but are rather improved by the process, and when they have been raked for several years in succession, the cranberries may be gathered with greater ease than at first.

These meadows should be flowed during the winter, and the water need not to be drawn off until May. The precise time for drawing it off has not yet been settled, and we solicit communications on the subject.

The berry is a quite wholesome fruit and grateful to the taste. And when apples are scarce the price it commands in the market will well repay the farmer for a little attention to his cranberry meadow. Indeed some farmers who are skilled in the art of gathering think these meadows the most profitable lands they possess.

ON THE CULTURE AND CONSUMPTION OF MANGEL WURZEL.

From the Edinburgh Farmers' Magazine.

I have lately seen a considerable diversity of opinions as to the utility of raising the root called mangel wurzel, or what was some years ago called the root of scarcity; it is a coarse variety of the beet root, well known to every gardener.

In order to ascertain its value as food for cattle, I raised, in the years 1790, 1791, and 1792, a considerable quantity of it, which I found it very easy to do, as it grows to a great bulk in all grounds that are of a deep earth, although of indifferent texture or quality. I had also a quantity of cabbages, of the large coarse Yorkshire sort, and carrots, the same years. I found, by trying the weight of each, upon a given quantity of square yards, that the mangel wurzel weighed the most; I then set about trying to feed one cow on it, one on carrots, and one on cabbages. I found the two fed with the two last mentioned roots soon took to fattening, and their improvement was every day visible; while the one fed on the root of scarcity, (as it was then called), made no progress. I imputed this to her getting it in too large quantities, and I then gave less. You will observe, I allowed all the three cows to have just as much as they could consume of each sort of food. I found, in so doing, no bad effects from the carrots, nor from the cabbages, except when the cabbages happened to be frosted; in that case, if the animal eat too much, it swelled, but was easily cured by a small quantity of salt-water, blood warm, poured down its throat. But I found, by persisting in feeding on with the mangel wurzel, the animal took on no additional flesh, and rather inclined to scour too much; I was then obliged to desist from my experiment. Having a considerable quantity of the root, I next tried my milk cows with moderate quantities at a time, but did not find it increase the quantity of milk, or improve the quality of the butter, like carrots or fresh cabbages, given in the same quantities. I then gave the remainder to my swine, and found them not so fond of them as they are of potatoes. I of course gave the raising of it up as an unprofitable concern, and am indeed firmly of opinion, that where a farmer can command manures to raise potatoes; carrots, cabbages, and turnips in all their different varieties, he should never spend his time in raising the beet root.

I am, sir, your most obedient servant,

JAS. TROTTER.

Newton, January 10, 1815.

COTTON SEED.

From the Carolina Planter.

I promised to advert again to cotton seed, as a manure. I have said it is the very best we have, and I do not think there is a planter who will disagree with me. It was formerly thought that it was not suitable for cotton—I know planters now who plant—erroneously I think—a double quantity of seed, that a portion of it may serve for manure. I have manured cotton for eight crops with it, and found that it uniformly produced better results than any other manure. It does not last so long, its effects being scarcely visible after the second year, and greatly diminished after the first. I do not think either that is as easy to obtain and keep a good stand on ground, manured with it—but I have heard that objection made to all kinds of manure—and from my experience I would advise that more seed should be put on manured land in general. Cotton seed is valuable as a manure for gardens, and there is something peculiar in its effects on strawberries, and is sometimes carried to the north for the purpose of improving that delicious fruit. It is, however liable to an objection in gardens. It undoubtedly produces worms, and I have sometimes thought ants.

There is great carelessness and loss in taking care of cotton seed—most persons throw the seed, they save for planting, into a bulk, where it heats

and spoils, and occasions a bad stand—while that intended for manure is picked out of the gin house window and left exposed to sun and rain, by means of which, much of the bulk and more of the oil and gas is lost. For the last few years I have had a large room built at the side of my gin house, under the window. The floor I had regularly tongued and grooved, and made water tight, the sides weather boarded, and the top covered with plank as securely as possible. Right under the window, there is a hole in the top in which the seed is thrown—some time in the month of January, I have the top taken off that the rain may get to the seed and destroy the germinating principle—a better plan would be to keep on the top, and a few days before the manure is hauled into the field, have one or more large holes made in it, to the bottom, and fill them with water. Or it may be left a week or so in the field in small piles. However this may be, by preserving the seed from sun and rain as long as possible, more is added or preserved to the amount of the manure than any one would suppose. The bottom of my floor when seed is removed, always appears saturated with oil, and I have no doubt oil would run from the heap, if the floor had been made with a suitable inclination.

This plan I would recommend for the adoption of all who are desirous of increasing the quantity and preserving the quality of their manure at the smallest cost. Some planters haul their seed into the fields as soon as ginned, and pile it on leaves or straw, and making a layer of leaves, and one of seed to the top. This is a good plan—attended, however, with some additional labor, and the loss of something in the quality of the manure. All the virtue imparted by the cotton seed to the leaves is preserved, but not better than in the seed itself in the box, while much is necessarily lost by evaporation. Besides the leaves can scarcely be made very available manure by this process in due time—I have not, however, tried it. Other planters haul their seed into the cow and stable yards, and make a sort of compost. The quality of the compost is greatly improved, and this manure is perhaps the richest in the world, but the loss in quantity is immense and the trouble considerable. Now I go to save time and labor in all things, as much in making and applying manure, as in any thing else.

There are many opinions as to the method of applying the seed as manure, and the quantity to be applied. My plan has been with cotton, to run a furrow, fill it up and bed on it, and with corn to drop the grain and throw a handful on it, and do no more until the corn comes up through it. If it produces worms the sun will kill them—if it produces noxious gases, destructive to vegetable life, they evaporate, and if something is lost in the strength of the manure much time is gained in the method of application. It answers well. I know by experience. Some sow their seed broad cast, plough them in and plant. I cannot think this a good plan, though I have heard it highly commended. For small grain, for which nothing is so good as cotton seed—I know it does well, for every grain then has its manure—but before the corn or cotton roots can well reach the centre of the rows, manure so disposed must be greately impaired. Some persons contend that not less that a hundred bushels of seed to the acre will do any good—others that thirty bushels are sufficient. The truth lies between. I usually apply a wagon load lightly thrown on—probably about 70 bushels, on cotton ground, and on corn perhaps not over fifty bushels. Any quantity will do good, and for my own part I have never thought I had done harm by putting too much.

I intended when I began to have said something of the system of *purchasing* cotton seed for manure, now adopted by many excellent planters, but I have already made this article too long, and most defer my remarks for the present.

SHORT STAPLE.

WONDERS OF CULTIVATION.

From the Carolina Planter.

There is scarcely a vegetable which we now cultivate, that can be found to grow naturally. Buffon has stated that our wheat is a fictitious production, raised to its present condition by the art of agriculture. Rye, rice, barley, or even oats, are not to be found wild, that is to say growing natural in any part of the earth, but have been altered by the industry of mankind from plants not now resembling them, even in such a degree as to enable us to recognize their relations. The acrid and disagreeable *opium graveolens* has been transformed into delicious celery, and the colewort, and plant of scanty leaves, not weighing altogether half an ounce, has been improved into cabbage, whose leaves alone weigh many pounds, or into the cauliflower of considerable dimensions, being only the embryo of a few buds, which in their natural state would not have weighed as many grains. The potato again, whose introduction has added millions to our population, derives its origin from a small bitter root, which grows wild in Chili and Monte Video.

ALLOWANCE OF WATER TO HORSES.

From the Sporting Magazine.

It is by no means an uncommon notion that if horses are to be got into condition for work, they should be allowed to drink but a very small quantity of water. On what physiological basis this opinion is founded, I confess appears to me a perfect mystery. Nevertheless, as many persons adopt this treatment, it is fitting to notice it. For my own part, I have ever found that it is an extremely bad plan to stint a horse in his water, and have consequently always made a practice of leaving plenty of it at all times within reach of every horse I have had. Of course I do not intend to say that when a horse comes in heated from exercise he should be suffered to drink, or should have a bellyfull of water just prior to being ridden; but if a horse be watered *ad libitum* in the morning, he will not require to drink again for some hours, and should never be allowed to do so then unless perfectly cool. Those horses that are only supplied with a limited quantity of water at a time, and are never permitted to slake their thirst fully, will be much more liable to be griped, if at any time they by chance should drink their fill, than those that are always suffered to take as much as nature dictates to them: but should a horse have been hard worked and come into his

stable very hot, I would, after having seen him well dried, only give him a small quantity, for two reasons; first, because his eagerness for water may lead him to drink more at a time than is good for him; and, secondly, because a large quantity of water will probably cause him to break out into a cold sweat, in which he may remain all night if not looked to. After having taken a third, or less, of a stable pailful of water, he should be kept without any for some time, and then be allowed to take what he pleases. When, however, you intend to stint your horses in this way, do not suffer your groom to offer him a pailful of water, and to take it from him when he has drunk a small portion of it, but let just the quantity you wish him to have, and no more, be given to him; he will then feel to a certain degree satisfied with what he gets; whereas by taking from him what he expects to have, he becomes fretful and discontented. In the first instance he makes up his mind to slake his thirst with a short allowance of water; whereas in the second his just expectations are balked in mid career, and his imagination cheated as it were in the height of his enjoyment—and there is much more in this than may be supposed. Physiologists are well aware of the connexion existing between the stomach and the brain; and those who have not inquired into this fact must either do so before they attempt to refute it, or take what I have said as proved.

WITCH [OR WIRE] GRASS.

From the Maine Cultivator.

A writer in the Farmers' Register, whose article we find copied into the New England Farmer, affirms with great confidence, as if he had made a very important discovery, that lands infested with witch grass, may be effectually expurgated of that weed by pasturing sheep upon it. The man is mistaken. He supposes, because the roots, after the land is laid down, become fine and almost imperceptible, that the soil is entirely free from them. If he will plough up and cultivate the land again, he will find that those little fine roots, which he supposes can no longer be witch grass roots, because they are so small, will swell up again and stretch out as they were before being driven into insignificance by the land's having been laid down. We have been deceived in the same way ourselves. A neighbor had a piece of land that was formerly infested with witch grass, but for several years latterly had been devoted to the pasturing of sheep. On turning up the sward with a shovel, it appeared as if there were no longer any witch grass roots in it. Wishing to improve a small garden spot we removed several loads of the soil to the garden and ploughed it in. In a short time the deceitful little roots swelled out, and we found that we had thus unwittingly introduced an enemy to a fearful extent. The theory of the Farmers' Register is a mistaken one.

After all, witch grass is not so bad an affair. It does but little injury to crops if often hoed, keeps the soil light and free—and, as a grass plat, affords the earliest and most constant feed for cattle.—There is no sweeter grass than this, and none that makes better hay when cut early. You can get three crops of witch grass hay in one season, as well as two crops of any other sort of grass. It is an enemy indeed in the garden, and the best way to exterminate it here, is to dig it all out from the beds by the roots, and carry it off. We have gone over a garden of an acre in this way, and have completely triumphed.

TO FARMERS.

For the Farmers' Register.

No country can be truly wealthy, without being a large agricultural producer. All the commerce and manufactures of England, great and mighty as they are, could never alone enrich her. This assertion may seem a fallacy to some; but it is nevertheless true, that her chief wealth is her enlightened spirit of agriculture. It is from this source mainly that her princely nobles derive their immense income; and of more real comfort than the average of our agricultural community. I speak of the tenantry, not of the laborers; but even this latter class is a thousand times better off than their newspaper statements would lead us to believe. The main attention of America should continue to be her agriculture; they cannot be too often, too earnestly, or too emphatically urged upon the minds of her enterprising sons; pay strict attention to this, and manufactures and commerce will follow as a necessary consequence.

Our wealth and strength will be greatly increased; we shall obtain a much greater average crop from the same number of acres under cultivation, having better roads, better buildings, and above all a more enlightened and thorough education to the agricultural community. If any one class of men in our great republic is to be better educated than another, it should be the directors of the agriculture of the country. A PUPIL.

Chesterfield, 1840.

ARTESIAN WELL AT GRENELLE.

From the Mining Review.

At the last sitting of the Academy of Science, M. Arago stated that he had that morning been making some thermometrical experiments at the Artesian well at Grenelle, in order to ascertain the temperature at the depth which had already been attained, viz., 483 metres, or 1584 feet. When the workmen had reached 460 metres the chalk was of a green color, indicating the proximity of water. Since then the chalk had become mixed with clay, and of a dark color, a still stronger indication that the sheet of water which it is intended to meet is near. M. Arago used the thermometer of M. Walferdin, and after having taken all the necessary precautions in order that the pressure, which at such a depth is equal to fifty atmospheres, might not injure the bulb, six thermometers of the same kind were successively let down to a depth of 481 metres, care having been taken not to lower them until thirty-six hours had elapsed after the boring, in order that the heat which this work might have communicated should have subsided. The thermometers were left in the well for thirty-six hours. The heat at this depth was twenty-

seven degrees of Reaumur, or 92¾ of Fahrenheit, being about twenty-three metres for each degree of temperature. M. Arago expressed a hope that no water might be found for 100 metres more, as in that case there would be a permanent hot spring at the very gates of Paris.

REVIEW OF A "NEW ESSAY ON FIORIN GRASS, INCLUDING THE HISTORY OF ITS DISCOVERY, AND AN ACCOUNT OF ITS VALUABLE QUALITIES, AND MODE OF CULTURE." BY WILLIAM RICHARDSON, D. D. London, Harding, 1813. pp. 91.

From the Edinburgh Farmers' Magazine.

Dr. R. is certainly one of the most persevering, indefatigable, and patriotic characters of the present age. It is very fortunate for the world, that a discovery of such importance as that of fiorin should have been made by such a gentleman. There are very few, indeed, who would have encountered, with so much disinterested zeal and fortitude, the host of enemies that have assailed him; and scarcely any that could have acquitted themselves with so much ability. Like some other great heroes, he does appear at times to be a little irascible; but that is not to be wondered at, when it is considered that "he has been attacked from all quarters; and, while his fiorin was only gaining ground by inches, he had as many battles to fight in support of this native vegetable, as Henry the Fourth had to engage in for the recovery of his hereditary kingdom." So much paper indeed has been expended in these numerous conflicts, and so true it is, that, after all, fiorin has only gained ground by inches, that it is not improbable the whole of the crops in Scotland might be covered by the learned and unlearned essays, letters, and dissertations, that have been written and printed respecting this wonderful grass;—a melancholy proof certainly of the obstinate prejudices of mankind against every new discovery, however valuable. And yet we must say, for the honor of our country, upon the authority of Dr. R. himself, that we are much more open to conviction, and much more tractable, than our southern neighbors.

Concerning several late discoveries, such as the culture of wheat in the Highlands of Scotland, the inexpediency of summer-fallow on heavy soils, and others of the same kind, a difference of opinion still prevails; and, with regard to the notable expedient of reducing the several breeds of live-stock to a single breed, the difficulty of providing a sufficiency of winter food in many parts of Scotland appeared to be almost unsurmountable. Red clover and rye-grass will afford but a poor crop on the bleak heathy mountain; and neither turnip, nor even ruta baga, are found capable of resisting the successive frosts and thaws of our severe climate, even if it were possible to raise good crops of them in such situations. Hence any kind of herbage that would supply the place of hay and succulent food in our mountain districts, must always have been a most important desideratum.

When it was said, a few years ago, that the most barren moors and mosses could produce such herbage, and that there was a native vegetable to be found every where, which, upon such land, would yield a crop of hay thrice the weight of that of the best meadows of England, and of a far superior quality, it was naturally to be expected that farmers would be somewhat incredulous. But now that the fact has been ascertained, and indeed 'demonstrated' by Dr. R., it is quite unaccountable to find men still exclaiming against a discovery for which they had long wished, and against a crop, from the want of which they had felt much loss, and always very serious inconvenience.

It would have been our duty, long ago, to have laid before our readers some very excellent specimens of controversial acumen on this subject, had it not appeared to be more "decent and honorable" (to adopt the words of our author) "to leave the projector a clear stage, and a fair opportunity to make his own way." As he very judiciously adds, "if his discovery was nothing, and his schemes futile, the world would soon detect him, as they have already so often of themselves detected and ridiculed the puffed discoveries of pompous charlatans.' But it is now full time that the benefit of our author's discovery should be extended over every part of Scotland at least, and that we should contribute our mite for that purpose. If our English readers should still remain obstinate and perverse, they have only themselves to blame for the consequences.

The first questions that it seems natural to ask about this grass regard the discovery of it—its properties—the amount of its produce—and its application.

Second, It must be desirable to know upon what soils it will prosper, and how it should be cultivated.

Lastly, What are the peculiar advantages to be obtained from its culture to individuals, in the first instance, and ultimately to the public at large?

In arranging and condensing Dr. R.'s observations, under these several heads, it may be necessary to notice, very shortly, the objections that have been made to his statements; and also the omissions, which it may be readily believed will often be chargeable against a writer whose mind is too much occupied with leading topics, to suffer him to attend to minute details.

To the *discovery* of the valuable properties of this grass, our author positively lays claim, and gives a full account of the steps by which he had acquired this knowledge. These properties, he observes, "have escaped the attention of man for five thousand years." This discovery, too, "of which the world begins now to feel the importance, was not the result of accident, or a *lucky hit*, thrown in my way by good fortune, but the very thing I was in search of." Notwithstanding this the doctor admits, that "the aborigines of the British isles seem all to have had some vague notion of the value of fiorin;" that it was not "unknown to the botanical writers of the seventeenth century;" that 25 years ago, "the Reverend Marcus M'Cousland, descanting on the value of a piece of ground he had recovered from the sea," exclaimed, "See, it is all fiorin!" and that the natives of the wild parts of Donegal, always charged a higher price for fiorin hay, though spontaneous, than for that made of other grass. All this time the Doctor did not even know it. He had taken pains, about eight years ago, to procure some plants, but did not succeed; and at last found a tenant who said he knew the grass. "I went with him to my bog, where he showed it to

me in abundance." After some experiments with nine roots raised from this bog, the author laid down a rood with fiorin, after a crop of potatoes, on the 15th November 1806.

It is not our business to reconcile these accounts. One thing cannot be disputed. The doctor has the merit of having first discovered that it was infinitely more valuable than any other grass, and than any other person seems ever to have imagined, or will yet believe. Mr. Wakefield, in his late account of Ireland, not only denies the author's right to this discovery, but that he was even the first cultivator of it; and refers to the surveys of Tyrone and Derry, to prove that it had been previously cultivated by Mr. M'Evoy, and the Reverend Mr. Samson. In reply to this, our author very liberally abuses Mr. Wakefield, and seems to withdraw his pretensions.

Be this as it may, it is of more importance to be able to distinguish this grass from every other; and, to all appearance, this is no easy matter. "The slightest assistance is not to be derived from botanical books;" and, in the whole of this essay, there is not a word of description to enable the reader to select the fiorin cultivated by Dr. R. from other stoloniferous grasses. At one time, his directions to those who sought for fiorin stolones, were, "to raise the grass growing in contact with the north wall of their parish church, telling them they would find it to be fiorin." But this simple expedient must not be depended on for success, now that it appears from Sir H. Davy's experiments that there are at least two varieties;—the *latifolia* cultivated by Dr. R., and the *angustifolia*, of much less value.

Respecting its *properties* also, the information is not quite so full and satisfactory as might be wished. It would have been of importance to know the weight of it consumed by horses and cattle, that it might be compared with that of other hay; and particularly, whether horses enjoy the same health and vigor when fed on dry fiorin, as on good clover and rye-grass hay. Yet a vegetable, which possesses the properties ascribed to fiorin in the following extracts, must be of extreme importance.

"See the contrast—our native fiorin has no disorders, no enemies; the vicissitudes of season make no impression upon it; and this hardy grass vegetates in the severest frost; its stolones continue to lengthen under the snow: deluges of rain do not in the least injure it; and if Nature has thrown its period of perfection into the winter season, she has had the kindness amply to compensate by making both the plan and its enormous crop equally insensible to the severities attendant on the season. And though we cannot accumulate a fiorin crop in the short and moist days of the brumal months, we can consume it to the greatest advantage in that period; and should we mow more than we can use, we know that fiorin grass will remain on the ground without injury, until the lengthening day brings sufficient drought to enable us to convert into excellent hay, both what was cut, and what was left uncut through the winter.' p. 25.

"During the time I was thus endeavoring to ascertain the extent to which fiorin culture might be carried, I was equally diligent in trying the various modes in which it might be applied to use in rural economy. I soon discovered that either dry or green fiorin enriched the milk of the cows fed upon it, more than any other food I had ever tried, and that its fattening powers far exceeded those of any other hay; that as a green food, its value was incalculable, coming in aid of the soiling system early in September, and continuing a most luxuriant and succulent food, even until the middle of May." p. 19, 20.

There is nothing, one should think, can be better ascertained than the *amount of its produce*:—for a great number of high authorities, high at least in point of rank and general knowledge, have been adduced; and his people have been examined on oath respecting its weight and other circumstances.

"The following statements of quantity of fiorin crop, are established with precision, viz.
"1808, Seven ton, four hundred, one quarter, four pounds.
1809, Eight ton, five hundred, two quarters, twenty-four pounds.
1810, Season so desperate, never weighed.
1811, Eight ton and upwards."

From this and other statements, the doctor infers "that fiorin grass produces treble crops of hay,—that at least is completely established;—as, of 6 crops carefully weighed, every one of them far exceeded treble the highest average ever made from a hay crop."

The only objections that have been made to this inference are, that others cannot raise such great crops, not even the half of these weights; that fiorin grass does not "produce" hay at all,—though it is perhaps something better; and that it is absurd and fallacious to compare a crop produced in 6 or 8 weeks only, with one which requires to occupy the ground for a whole year. It has been said, with some appearance of reason, that the author should have brought into view the early spring food obtained from meadows and artificial grasses, and also the second and sometimes third crops after the hay crop, or the value of the pasturage till the fields are again shut up for hay, or ploughed for a crop in March. Fiorin gives neither early pasture so valuable for ewes and lambs and fattening stock, nor a second crop which may be either cut for hay or soiling, nor any after eatage, like the land which produces the hay with which it is compared.

The *application* of the author's crops is no where distinctly stated. One cannot but wish for particulars on this head. How many horses, cattle and sheep does he support from a given quantity of land under fiorin? The weight of the crop is of itself no criterion of value. Of this succulent food perhaps twice the weight of hay is consumed.

In the second place, it must be desirable to know upon what soils fiorin will prosper, and how it should be cultivated.

With regard to the kind of soil it seems to be of no consequence whatever. The doctor has raised excellent meadows on miry bog, so wet, that he describes it, in Ovid's words, as being "*Instabilis terra innabilis unda.*" It grows spontaneously on dry sandy grounds, with so much vigor, that he has recommended its cultivation on the blowing sands of the Hebrides, as an excellent expedient for preventing the destruction of the contiguous land, and at the same time converting these blowing sands into better meadow than any in England. There is very little concerning the mode of cultivating it in this essay, which in this instance does

not very well accord with its title; but it has been already described in this and various other journals. The doctor's rood laid down in November, 1806, is "light dry upland ground, and got a very weak top-dressing every year; always turf mould with a little ashes." The sixth crop, mown in October, 1812, was like all the former ones very fine.

The greater part of the essay is occupied with a display of the vast advantage that cannot fail to be derived from this important discovery, both to individuals and the public at large; which was the last branch of our inquiry. Fortunately, on this point there is little more to be wished for. It is now only necessary to consider its advantages in a national view; and here we must give Dr. R. the merit of having made more of his premises, such as they are, than perhaps any other gentleman in the united kingdom could have done.

The doctor's *first* object is to show, that "it shall not again be necessary either to import grain or export bullion;" but that we shall resume our former enviable description—a *grain exporting country.*" To establish this comfortable conclusion, the country is divided into land of three descriptions. The first includes "boggy and miry ground contiguous to the farms or demesnes of proprietors."

"The discovery of the facility with which these *now* unprofitable wastes may be made, at small expense: to produce crops of the highest value, will no doubt bring many of their proprietors into action; superabundance of hay will be the immediate result; what then becomes of the ancient meadows that have hitherto supplied Mr. Miller, and the gentlemen of this description with hay? must they not be instantly converted into tillage grounds? and with the advantage of a profusion of manure, derived from the cattle fed from meadows which never require animal dung, ashes from the spot answering the same purpose. The immense addition to our grain crops that will arise from this source, must be obvious to every one, who has travelled through Ireland, Scotland, and more particularly the north of England.

"The *next* description comprehends the extensive grazing farms scattered through the mountain districts of our islands. The cattle fed upon these bleak pastures through the summer, are at present sold off, or sent elsewhere to find sustenance through the winter.

"But now, since we became acquainted with this hardy vegetable, we know that we can make fiorin meadows on the cheapest terms, and to any extent, through every part of these dreary regions, which will not again be depopulated in winter, their cattle finding food within their own limits, in greater abundance in winter than in summer; and administered to them with the greatest facility."

The *third* is by far the "most important of the three descriptions of ground," and comprehends the cultivated farms spread over the whole face of our islands. To introduce fiorin culture here, the author very judiciously considers, that two positions must be established—first, that fiorin "produces steadily hay crops more than treble the amount of what we now mow from the same extent of ground." Of this there can no longer be any doubt; for he assures us, "that the *lowest* amount of an acre of fiorin he ever knew weighed was seven load 200 lib. The second position regards the great value of fiorin, which is equally well established. These points being thus settled, "let us try the result, and see what effect is likely to be produced on the third description of territory into which I have supposed our islands to be divided; to wit, the mass of cultivated farms spread over England and Wales, stated to amount to 11,500,000 acres of arable, and 6,000,000 acres of meadow. Vast quantities of these meadows must rapidly be laid down with a new grass, admitted to produce treble as much hay as is afforded by the grasses now clothing our present meadows; and vast quantities of them must be applied to tillage, the proprietors being supplied with better and more abundant hay from one-third of the same ground. How much the eleven one-half million acres of arable will be augmented by this transfer, and how far the six million acres of meadow will be reduced, are questions to be answered only by conjecture.

I am sure I make great concessions, if I admit one-third of our meadows to remain in their present state, after the proprietor is convinced that he has it in his power to treble their crops, and that one-third only is laid down with fiorin. We add then two million acres (the other third) to our tillage ground, and we increase our hay crop by one-third. Our tillage ground, 11,500,000 acres at present, is increased by more than one-sixth; we can now throw some light on the subject, limiting ourselves to wheat. Other crops applicable to the food of man will no doubt be also raised; but I do not take these into consideration, leaving them out to make my general conclusions more secure.

"Mr. M'Pherson makes the average produce of wheat in England and Wales 8,000,000 quarters; let us suppose the same proportion to hold in the two million acres we have added to our tillage ground, and we add annually to our present produce of wheat one-sixth, that is, 1,333,333 quarters of wheat. The average importation before 1797, was 400,000 quarters for some years; in 1799, 415,647; in 1800, it was 1,174,654 quarters; and in 1801, 1,186,236; thus it appears, that the quantity of wheat likely to be brought by the introduction of fiorin grass into general use, is more than treble the average importation for many years, and exceeds the importation in either of the two years of famine, when it rose to a height it had never approached before. I fear the importations of late have been weightier; but I have not yet received a statement of them. Whoever attends minutely to my calculations, will find I have much to spare.

"Surely with the great addition I have made to our resources, we shall never be obliged to import another quarter of wheat, or to send one guinea abroad for food; no, but we shall soon resume our former enviable description—*a grain exporting country.*

Let us try the question in another point of view. We have added two million acres to our tillage ground, and it is not unreasonable to suppose each of these produces a crop of wheat every fourth year; for the meadows we transfer to tillage are our very best ground. Dropping then (as before) all consideration of other crops, we have thus made an annual addition to our wheat crops of 500,000 acres of wheat, which, at three quarters per acre, gives us a steady increase of 1,500,000 quarters, still more than the preceding amount.

The approximation of these two results, tends much to confirm the fairness of each of them.

I must observe, that although these results so completely establish my friend Mr. Miller's position, as to the effects the introduction of fiorin grass must necessarily produce; yet they are deduced from but one of the three descriptions of ground into which I have divided our islands, viz. our present cultivated farms.

The addition that will be made to our grain crops by the cultivation of fiorin on our peaty moors, upon which I have already dwelled, is not taken into consideration. Neither is the improvement and extensions our agricultural fields must derive from scattering meadows, clothed with this luxuriant grass, through all the dreary mountain tracts so profusely spread over Great Britain and Ireland, called in aid of my friend's position, "that it shall not again be necessary either to import grain, or export our bullion, p. 47-51.

Upon these very ingenious calculations and deductions and suppositions, it does not seem to be our business to offer much of remark. Unfortunately we have enough of "miry boggy land," and also of mountain tracts, but scarcely any meadow that can be converted into arable land. It was, therefore, very proper to confine the preceding statements to England, though it might have been as well to have begun with the wastes, instead of the meadows. If the English meadows are to be broken up, which is not a very probable occurrence, those concerned will no doubt be fully satisfied about the foundation upon which this splendid superstructure is to be reared—the treble crops and superior quality of fiorin. They may still, however, have to choose between a regular rotation of grain crops, and clovers and turnips, and a fiorin meadow one-third the extent of their present alternate meadows and pastures. They must also consider whether this diminution of their pastures will not occasion a scarcity of butcher-meat and dairy produce, to place against the superabundance of grain. For fiorin, though it is said to be found in all our pastures, does not itself admit of being pastured—facts, like several others, somewhat perplexing and discordant. Another difficulty occurs about manuring the fiorin every year. In Scotland, there is always both a grain and a cattle crop raised from one dunging, and more commonly two of each; on English meadows, first year a hay crop, and the next year pasture. On the miry bogs and mountain farms, all that is necessary is to procure ashes, by burning the nearest wild land, or, according to the good practice of our forefathers, to enrich one spot by the ruin of ten times its extent: but this cannot well be done on "cultivated farms." The compost of dung, ashes, and lime, afterwards recommended, or the plain earth alone to be applied to the oak-land, are not always to be got; and if recourse is had to dung by itself for this yearly top-dressing, the land in tillage may be somewhat defrauded. Besides all this, it might have occurred to Dr. R., that the population of Great Britain will certainly increase with the increase of food; that there is no country to which a temporary surplus can be exported, unless by means of a large bounty, and therefore that no surplus will be produced; and that, much as the continuance of the late excessive importation may be deprecated, it is perhaps quite as enviable, that Britain should continue to clothe other countries, as to feed them with her raw produce. Dr. R., with a view to this point, may compare the condition of the laboring classes of England, which imports so largely, with that of those on his side of the water, from whence large exportations have been lately made.

A great many other beneficial effects would result from the cultivation of fiorin, which we have only room to enumerate. 1st, It would "restrain the occasional enormous rise of the poor-rates, by preventing the recurrence of scarcity and dearth. 2d, It would both maintain and employ our population. 3d, The increase of our agricultural population is a necessary consequence. 4th, "The introduction of fiorin will make an era of much importance to the breeders and feeders of sheep," and probably lead to a great improvement of wool. 5th, Fiorin is very proper for being distilled, and yields excellent spirits; and last of all, though not least, "it shall now appear capable of contributing materially to our national strength and defence."

"I little thought, when I was developing successively the different valuable qualities of fiorin, that I should discover this diminutive grass might be made an important friend to our navy, and a useful associate in raising *oak* for its supply.

"The properties of the oak, connected with my plan, are two—a distinct solitary stem, and great slowness of growth. Each of these is highly favorable to the measure I propose, that is, to make the same enclosure an oak plantation and a fiorin meadow; by the former the erect oaks will little interfere with the fiorin crop; by the latter the proprietor will long enjoy the benefit of a valuable fiorin meadow."

This brilliant conception is then illustrated at some length; but our limits for such an article have been already exceeded. Those who wish to know the value of coppice and standard reserves, and of the yearly thinnings of a mixed plantation, will find some information in the first branch of this number; and may choose between our author's fiorin, and either of these methods of rearing timber trees.

If we should now bring this article to a conclusion, we should probably disappoint the just expectation of many of our readers. Of this essay, then, we will say, that from beginning to end it is written in the language of enthusiasm; and the author either knows not, or spurns at the dictates of reason and experience. A very slight acquaintance with the most approved practices of modern husbandry would have convinced him, that there is very little room in it, for a plant, which can neither supply the place of old feeding pastures, nor of artificial grasses, nor of winter crops of common and Swedish turnips. From these lofty anticipations, let us turn to such facts as seem deducible from our present very limited experience.

We do not fear being contradicted by any person in Scotland, who has attempted the cultivation of fiorin, when we say that it is altogether unsuitable for arable lands. Should any farmer in the Lothians or Berwickshire, plant fiorin upon any considerable portion of land, capable of growing clovers or turnips, it would be held a decisive proof that his mind was fast verging to confirmed insanity. A few small patches of such land have been planted by way of experiment along-side of tillage crops; and it will not be easy to prevail with those

who made these experiments, or with such as had access to inspect them, to make any new trials.

Upon dry sandy soils, of whatever quality, fiorin has produced a very insignificant crop. Some of the Scottish gentlemen, to whom the doctor refers, will not hesitate to admit this. A piece of land, laid down in May 1812, under the doctor's personal superintendence, gave a crop of about 3 tons per Scots acre of half-dried grass last year, and this year scarcely a plant was to be found. Another spot, carrying the first crop, which had been treated *secundum artem* by another of the doctor's pupils, was inspected a few weeks ago. The crop was miserable upon the high parts of the field, but not so bad at the bottom, where the soil was moist and deep. It might average about half a ton per Scotch acre, and was to be ploughed up as soon as the crop was removed. The same gentleman had another patch carrying a crop of the third year, which at the end of September his servants were cutting for the stables. The ground appeared fully stocked with plants; the soil was a rich deep sandy loam, worth 3 guineas an acre. The crop last year weighed 150 Scots stones (1½ ton) per Scots acre; and it was estimated at the same weight this year. A third gentleman laid down 12 acres with fiorin in a situation where he expected to have the command of water for irrigation. The water was not thrown over it in a sufficient manner; and though it got a good top dressing, the crop has altogether failed. It is needless to enumerate more instances of the same kind.

The only description of land where this cultivation has been in any degree successful in Scotland is that with which the doctor himself began his experiments—"miry bog." Such land has certainly in some cases produced a great weight of this aquatic; and should it remain in the soil, of which one of the earliest cultivators now entertains much doubt, it must be considered as a most valuable discovery. Every thing that can be got from such land, after expenses are defrayed, may be considered as clear gain; and in those situations, where neither clover nor turnips can be raised, fiorin may probably be of very great importance as a succulent food for cattle in winter and spring. Wherever irrigation can be practised, there is reason to hope for the same result; though where the soil is dry, meadows will be much more profitably occupied by such plants as give early and late pasture, with a moderate hay crop between them.

We shall only offer one remark more. There is no considerate person, who can read this essay, without feeling a thorough conviction that Dr. R. has greatly "overstepped the modesty of nature," and provoked opposition by his lofty pretensions. It is unjust to charge landholders and farmers with an indiscriminate and inveterate hostility to innovation. There is no class of society more open to conviction, nor more ready to adopt every new practice, which gives a fair promise of augmenting the value of their produce, than that of the farmers of the arable districts of Scotland. Fiorin has now been tried for several years; and such are the results. If they should be called in question, by those who really wish for information, and not for controversy, they can easily be referred to the places to which we have alluded, where ocular inspection will in a moment dissipate the illusions raised by a thousand pages of declamation.

OBSERVATIONS ON THE CULTIVATION OF THE SUGAR BEET.*

The value and importance of the sugar beet as an addition to the agricultural productions of the farm, and an increase to the resources of the nation, is but commencing to develope itself. Wherever it has been tried, as food for cattle, it has given satisfaction.

So late as the year 1836, the sugar beet was first introduced into the United States, by a society in Philadelphia, whose object was to ascertain its value as a source from which sugar could be advantageously procured; and in pursuance of this object, that society sent an agent to Europe to observe and report the success that had attended the efforts of the French chemists and manufacturers; this led to the introduction of the seed. It is not the purpose of this paper to enter upon the sugar business; it is sufficient to observe that it has been so very successful in France, that it threatened to supersede the use of foreign sugar, and those merchants who were engaged in its importation, and interested in the sugar colonies, foreseeing the loss of what was their most important branch of business, applied to the French government for protection, and the consequence has been, that sugar made from beets in France has been subjected to an excise duty. It is possible, that the French government was apprehensive that the profits arising from making sugar from beets, might induce an undue proportion of land to be withdrawn from the production of grain, and employed in raising beets; and likewise the fear of lessening the commercial marine, influenced the imposing of this excise duty, and it gave to the mercantile and colonial interests, the protection they petitioned for.

The society referred to, had no intention of becoming a manufacturing one; the object being simply to ascertain and publish all the facts that could be procured relating to this new process of making sugar, import and disseminate some of the seeds, and the information that had been procured; when these objects were accomplished, the members paid the expenses and closed the concern. Up to this time there has been no manufactory for making beet sugar established in the United States. —Several trials have been made on an experimental scale;—the results of these went to confirm the practicability of what was stated to have been done in Europe, to wit: the crystallizing the saccharine matter of the beet.

The discoveries in modern chemistry, having shown, that saccharine or the element of sweetness is the basis of sugar, wine, vinegar, honey, &c. and as this element exists in beets and in grapes, it has led to the presumption, that wine may be made from beets, as well as from grapes; and in a letter from Paris, of date so late as October 16th, we find an intelligent gentleman, and a friend to the United States, writes to the following effect:

"By-the-by, you must know that our public papers have been of late full of another discovery, and that is beet wine. What do you think of that, my friend? Sugar being the principle, without which no vinous, fermented or distilled alcoholic liquor can be made, and the beet containing more

* Originally published in pamphlet form—Philadelphia, 1840.

saccharine matter than even the grape, why should the sweet beet not be used to make wine, if it can be divested of its empyreumatic oil and flavor, as it is in making sugar? The beet wine fever is now raging in France, as the morus multicaulis rages in the United States. Of its success in this grape-growing, wine-making country, I shall, as it developes, keep you advised."

The cultivation of this plant being new and interesting to the farmers of the United States, it may be useful to lay before them a few observations on the subject, for which we are mainly indebted to the gentleman to whom we have already referred; and what is said must be received as general principles; the practice that will suit in Maine will not answer in Georgia, and yet the beet is a plant that will thrive throughout the whole extent of the United States; and as a food for cattle will prove for this country all that the turnip is for the moist and humid climate of Great Britain.

Cultivation of beet.—The beet is a biennial plant growing to seed the second year, its seed-stalk rises to the height of from three to five feet. It is from the root, and in the first year of its growth that the sugar is extracted. As yet the process of extracting sugar from beet has not been made sufficiently perfect to obtain the whole saccharine matter, as in the case of the sugar cane, therefore the residue forms excellent food for cattle.

Choice of ground.—Beet thrives in the soil suited to the potato, to wit; in all soils that are somewhat sandy and loamy—these soils mixed with vegetable mould and decayed matter are particularly suitable. From land essentially sandy much cannot be expected, unless it be highly manured; under these circumstances we have seen a good crop growing in New Jersey. In the absence of manure the roots will be small, but where they grow fresh and healthy, it has been found that small plants yield a large proportion of sugar—but this by no means makes up for the want of mass, and therefore with this as with other crops—it is proper to use land naturally or artificially good, to insure large returns. Clay may be added to sandy soil, and sand mixed with clay ground, to correct their defects, but the process is expensive.

Where land is essentially stiff clay, it is not suitable for beets, because the seed germinates badly and the root, finding it difficult to penetrate and imbed itself, becomes forked and rises too much above the surface, whereby it is too much exposed to the sun and atmosphere, which dispose it to become hard and reedy. One of the evils attending forked roots is, that stones, gravel, and earth get enveloped in the interstices, and thus blunt and injure the machine that is employed to reduce the roots to pulp, when the object is to make sugar. Clay soils are improved by deep and frequent ploughing and harrowing; the manures best suited to this kind of ground, are half rotted straw, fresh stable dung, leaves, &c. and sand can be employed to advantage where it can be had with little labor; the quantity required to produce useful effects has to be very considerable. In France calcareous soils are not considered suited for growing beets. In America we may mistake what the French refer to, when on this occasion they use the term "calcareous;" possibly it may be by them applied to chalk soil, a kind of land we have none of, and not refer to the limestone land that abounds here, and is justly held in high estimation, as it answers well for all crops. The farmers of America must not be deterred from trying to cultivate beets on limestone land, because it is said of other countries, calcareous soils are not suited for growing that root; in this, as in many other cases, we must determine the fact by our own experience. Here, on limestone land, the beet may suffer from drought, but all crops grown upon it are exposed to the same effects. In France, the products on different soils vary very much, and are greatly influenced by better or worse management, the difference rating from fifty to two hundred.

Preparation of the ground.—This will vary according to the nature of the soil, and here, as in all other departments of the farming business, much of the success depends on the skill and judgment of the farmer. In many cases three ploughings will be necessary, and one of these ploughings should be before winter, that the turned up soil may be mellowed by the frost, the last ploughing has to be in the spring immediately before planting the seed; two ploughings in this country will be found sufficient; in all cases it should be well harrowed, and rolling will be an improvement that amply repays the expense. Deep ploughing is generally useful, but the farmer has to consider the nature of the substrata. It would be improper to turn up much of the poor clay or gravel bottom, and where the substrata is an open sand, deep ploughing is not required. Manure, in which the process of fermentation has not advanced far, will answer best for beets; nevertheless all kinds are useful; but the half rotten best divides the soil and suffers the roots freely to expand. In the state of Delaware, marl has been found an excellent manure for beets, and marl is found in many places in the low light soils on the Atlantic coast south of Sandy Hook. Some farmers in France allow the beet leaves that are cut off at harvest-time to remain on the land, and consider them a tolerably good manure, but this practice is not so good as having them carted into the barn yard to be eaten and trodden on by the cattle. It will be found that straw of any kind when properly laid into the furrows and covered with the mould, will give good crops; and this open species of manure is suited to clay soils and the beet root. The roller is especially necessary on clay soils; by it clods are well broken, which favors the coming up of the plants, and facilitates the future hoeings and horse-hoe weeding.

Of sowing.—There are four ways of sowing beets, first in beds as in a nursery; second, broad cast as in sowing wheat; third, sowing or dropping by the hand in drills; and fourth, drilling by a machine.

By the first of these methods the whole of the seed is sown on a small portion of land compared with what it is intended to occupy; these plants will be fit to pull up and plant out where they are finally to remain, in a month or six weeks from the time of sowing; this planting is performed by means of a dibble with which holes are made in the ground, always a little deeper than the length of the plant that is to be put into them, and with this dibble the earth must be carefully pressed close to the root. This method is attended with several inconveniences; it requires much manual labor, the roots are exposed to injury during the

process of transplanting, and if the root is bent in the planting, the beet will form badly, and in place of having the shape of a cone will be deformed and unthrifty, with numerous roots filled with earth, which will be detrimental to the crop, whether used for feeding cattle or employed to make sugar. This mode of sowing should be thought of only where seed is scarce, the quantity to be sown not great, and labor easily procured.

Broad cast. This manner is the simplest, but requires a large quantity of seed, and will be expensive where that is dear, and seed in the European market has on some occasions been five times dearer than on others. In this practice it will be found that six pounds of seed will be required where two and a half or three would have been enough when planted in drills by the hand. The whole of the soil in the broad cast sowing is occupied, but it is difficult and expensive to hoe the crop, and keep it free of weeds, and the produce is never as great as by the following method.

Rows or drills. The little furrows into which the seeds are to be dropped are made by a harrow, having the teeth at the distance one from another that the rows of beets are intended to be from each other and the seed is dropped two or three into the drills at the distance of twelve to eighteen inches apart from each other. This work can be performed by young people; in France it is most frequently done by women, as more dependence can be placed in them then in boys. After the planting is finished, the seeds are covered by having a light harrow with plenty of teeth in it drawn over the ground. In this way there is a great saving of seed and the plants are regularly spaced. Four women will plant an acre in a day. By using a drill drawn by a horse, the labor is very much abridged and the work will be expedited. This machine is very important to those who plant large fields; in the large sugar making districts it is used with great success, it is of various forms and merits; the plants have not yet been brought to this country. Some French farmers place the rows twenty four inches apart, perhaps thirty will be found a more convenient distance for the horse-hoe, cultivator, or harrow. In fixing the distance that is to be between the rows, reference should be had to the kind of horse-hoe that is to be used in keeping the crops free from weeds. The distance in the row may be from twelve to eighteen inches. When the plants are far from each other the roots will grow to a large size, and the coutrary will result from planting them close. By careful observation farmers have to learn the distance that will produce the largest quantity, and best quality of roots on their respective soils. The seed should be planted at the depth of from one to two inches. Experience has proved, that at a greater depth, especially on heavy soils, it is not sufficiently exposed to the action of the air, sun and moisture; without which it will not germinate well.

Time of sowing.—This depends on the position of the place and nature of the soil; as a general rule, the earlier the better: provided, the land is dry and in proper order, early sowing is particularly important when the object is to make sugar, because the roots arrive sooner at maturity and allow the process of crushing to commence early. In France it has been found that in September and October the greatest quantity of sugar can be extracted from the roots. In the United States, the nature of the fall season is very suitable for making sugar. The season for working here will be longer than it is in France, this will favor the manufacture here when it becomes a business. In Pennsylvania, beet sown so late as the first ten days of June came to perfection; but late sowing, exposes the young plants to be injured by the drought of that season, and the heat of the sun; we have heard of an instance where by accident some beet seed had been dropped in the fall and remained in the ground all winter, and in spring vegetated well, and yielded a good crop. This accident suggests the trying how far it would answer to sow a part of the crop in fall, so as to have an early crop, and what the result would be of having from this early sowing, the ground well covered with leaves before the summer's hot sun comes on. If fall sowing shall be found to answer, it would be of advantage to the farmer, by allowing him to have a part of the spring work done in a season in which he is not much hurried. This fall sowing should not be performed until late in the season, when all probability of warm weather has passed away, so that there might not be heat to germinate the seed before the cold and frost set in.

Of Hoeing.—Few plants suffer more than the beet from neglect, and the baneful influence of weeds in the first stages of its vegetation. The ground therefore has to be kept free of weeds, and it should be kept mellow during the first stages of the plants' developement. Beets require one or two hand thinnings, and as many hand hoeings. The first of the hoeings should be about when four or five of the leaves have put out, the second in from three to five weeks afterwards. Here it is proper to remark, that each of the burs that are planted is a cluster containing sometimes as many as four seeds; this is to be perceived by breaking one of these burs, in it will be found several small grains of white flour, and each gives out a separate plant. Mice are fond of this flour and will destroy the seed if they can get at it. All the plants save one must be pulled up at the time of hoeing; if not properly thinned there will be a cluster of leaves but very small roots; where there are blanks, they should be filled up with those pulled up from where there are two many. After the rows have been carefully freed from weeds and properly thinned, the horse-hoe, cultivator or drill harrow can be advantageously run between the rows. The horse-hoe, &c. has to be some inches narrower than the distance from row to row, and after each horse-hoeing, a person should go along the rows with a hand hoe, and remove the earth from such plants as may have had it thrown on them by the harrow, &c. If any of the beets should show a disposition to shoot out into the seed stalk, this must be stopped by cutting off these stalks, because this growth would be at the expense of the root. Some persons pull off a portion of the leaves to feed their cattle; the leaves also make excellent greens for the table; it is probable that taking these leaves is some detriment to the roots.

Harvesting.—The season for taking up the roots will vary with circumstances and localities, early and late sowing, &c. &c. In France beets ripen and the making of sugar commences about the end of September or beginning of October, and the evidences of the plant being ripe are the

falling down of the leaves, and those of a bright green turning yellow and brown. The influence of drought may bring on these appearances; the observing farmer will understand when this change is caused by heat, or want of moisture, indeed he has to attend to the weather and the appearance of the approach of winter that he may take advantage of all the growing season, and at the same time not be too late in harvesting, and thereby expose the crop to be injured by frost. The roots should be pulled by hand or assisted by the spade when necessary, and the person that pulls them must shake the earth of them and be careful not to strike one against another or in any way bruise them; bruising has the same effect on beets that it has on apples, in both cases it disposes them to rot. The person who pulls the beets should cut off the tops with a knife, being careful not to cut the beet. The leaves being cut off lessens the disposition of the root to vegetate, and it prepares them to be housed. The beets should lay on the ground until they are dry before they are housed.

Preservation.—The roots must not be left long on the ground exposed to air, heat and moisture; much heat or cold are both found detrimental, as a heat of fifty-six to sixty degrees Fahrenheit, in damp weather, will produce a fermentation sufficient to reduce the quantity of saccharine matter, and on the other hand, beets freeze very readily, so that only a few degrees below thirty-two will dispose them to rot.

The best aired cellar is not better for securing the beet than a judiciously made pit, wherein the beets are stored and covered with the earth that was dug from the pit. The dimension of pits may be varied to suit circumstances. It is most prudent not to make them large, because if from any cause a part of the contents of a pit begins to spoil, the disease is contagious and will spread through the whole mass. They may be made from four to five feet wide, and eight, ten or twelve long. One to two feet is deep enough; this hole is to be filled with beets, and piled up until they form a ridge, and the whole is to be covered with the earth dug from the pit, a drain should be cut round the heap, to carry off all water, it being of importance, that the beet be kept dry, and for this reason, ground naturally dry should be selected for the pits—perhaps in our severe climate it may be necessary to spread a little straw or corn stalks on the outside of the heaps, to keep out frost; if put inside it might rot and spoil the beets, and it may be useful to open the pits from time to time to air and keep them fresh, and if any are observed to spoil, they should be carefully taken out. The preserving of beets is the most difficult of all the branches connected with them.

Growing of the seed.—As the beet is a biennial plant it is only in the second year that it produces seed. The proper time for choosing the roots from which the seed is to be produced next year is when taking up the crop; these should be healthy, somewhat above the medium size in length and thickness; well formed and no ways forked, and of a fine light color; (if for sugar perfectly white,) they should be kept through winter in sand or dry earth, and placed in a temperate barn or cellar equally guarded from the influence of heat and cold. In the neighborhood of Philadelphia, they should be planted out in March or so soon as the land is in good order, and at the distance of two or three feet apart; this will be sufficient space for yielding the roots and leaves the requisite nourishment; the stalks will rise from three to five feet, and the branches being liable to split off, and break down, have to be supported by sticks or frames. When the seed is ripe, which will generally be in September, the said stalks are cut off, tied into bundles, and hung up, or laid over fences to dry—and then the seed is beaten off by switching the sheaves over a board set on its edge, or it may be thrashed. In France the seed is removed from the stems by hand, taking care too leave the small seeds that grow towards the outer end of the branches, as these seeds do not ripen well in that climate, which is moister than that of the United States. The next process is to expose the seed to the sun, and then it is put into sacks and kept in a dry place, where mice and vermin shall not have access to it. The average yield of plants in France is from four to six ounces of good seed. The beet in this country has been found to produce very good seed—it will therefore be prudent and a saving for farmers to raise enough for their own wants. And for some time, in all probability, it will be a profitable branch of business to raise some for sale.

General remarks.—The important uses to which the beet is now applied, having attracted great attention to its habits, it is found under some circumstances to degenerate; the seed of the white plant producing yellow and red roots; this tendency may be checked by changing the seed from clay to sandy, and from sandy to clay soils. Experience may show that changes from the north to the south, and from the south to the north, would be attended with good consequences. The seed, if carefully preserved from moisture, insects, and vermin, will keep for several years, but after four years it will not be prudent to sow it. When the object is to make sugar, care should be taken to have seed that will produce white roots, and early sowing will afford the opportunity of commencing the crushing and boiling at an early period. French writers on the subject inform us, that the early bruisings produce the largest proportion of sugar. Some of their remarks on soil, it is difficult for Americans to understand, as in this country we have no chalk soil. The routine of crops where the beet is cultivated is very varied. Some French farmers plant potatoes the first year, beets the second, and clover the third—and repeat. Now we do not understand how clover can be made to follow beets, or how it could grow when sown amongst them, as it would be destroyed by the process of working the crop—but they may have an annual clover we are not acquainted with. Others sow beets two years in succession, oats the third, clover the fourth, and repeat. And one man is mentioned, who has sown beets with success, for fifteen years in succession on the same land; his practice was to change the nature and kind of manure and dressing put on the land.

In this country, as yet, there is nothing of strict system in the rotation of crops. The important article, Indian corn, grown all over the United States, and tobacco and cotton, in particular districts, renders it necessary for us, to adopt a system suited to our circumstances and resources; our farmers have to exercise their own judgment, and select practices suited to their particular positions.

In most instances, the beet crop will not be got off the land early enough to be followed by wheat, and late sown wheat in general is not a safe crop. Wheat is found to yield more grain with a less show of straw in those cases where manure is not directly applied to it, but to a previous crop. Where manure is immediately applied to wheat, it is more liable to mildew, than where it has been used to a preceding crop.

When the beet is employed in feeding cattle, one of the effects will be, to produce more and *richer* manure, and this will place in the farmer's power the entire command of his farm,—he can do with it whatever he pleases. Every encouragement is held out for the culture of beet. It being a green crop, draws much of its nourishment from the atmosphere, and in place of exhausting the land, leaves it in fine order, for any crop the farmer may choose to put on it. Beets in no way interfere with the cultivation of wheat, clover, barley, Indian corn, potatoes, turnips, &c. With the aid of a few beets, the profitable effects of that most useful grain, Indian corn, will be greatly increased in feeding cattle. Calves fed with beets or roots in their first winter, will generally be as good animals at the end of two years, as those that have been fed the first winter on dry food and corn, will be at the end of three years.

The raising a portion of beet is interesting to every farmer, inasmuch as the seed required to commence will put him to little expense, and afterwards he can supply himself; the business of his farm is the same as if he had planted an extra acre of potatoes, and the effects on milk, butter, cheese, fattening pigs, &c. is immediate. But on this crop, as in most new things, people will entertain different opinions; the merits of the question may be safely left to the decision of *self interest*, in a country where the people are fond of beef, butter, good meat and profit. The object of this paper is simply to furnish some information on the subject.

Although the intention of this paper is to call the attention of farmers, to the raising of beets, with a view to the improvement of their stock of cattle, their land, and their circumstances, it will not be out of place to draw their attention to another branch of the business of agriculture, that proves profitable to the husbandmen of other countries, and which is here more and more assuming an inviting appearance.

The best spermaceti oil, burnt in lamps, is now selling in Philadelphia at one dollar and fifty cents a gallon. The practice of using oil for lighting our houses, and its price, have for years been on the advance, and in consequence of the great number of whaling ships, the number of fish must be decreasing, and those that escape the fishermen, become more wary and shy. If oil in consequence of these *growing* causes, is so high in the seaboard towns, it will be higher in those of the interior, in proportion to the expense and hazard incident to transportation, therefore the farmer in these districts, has so much more inducement to raise the plants from which oil is made.

Most earnestly we recommend to farmers and planters, the growing of rape, which is a species of cabbage, or rather of greens, as it does not head. The French call it colza—and it is from the seed of this plant, that great quantities of oil are made by the French and English; and the former make from poppy seed abundance of table oil, so good in quality that it answers all the purposes of olive oil, and is much cheaper.

Those who are acquainted with the cultivation of these plants, (the rape and poppy,) harvesting the seed, and making the oil, could confer great service on the country by publishing the processes, or such of them as they are acquainted with; and there is every reason to presume, the publishers of the "Farmers' Cabinet," published in Philadelphia, the "Cultivator" at Albany, the "American Farmer" at Baltimore, and the "Farmers' Register" at Petersburg, &c. &c., would give the communications a place in the columns of their very useful periodicals.

It is with farmers, as with manufacturers, merchants, and tradesmen of all descriptions; all are exposed to the fluctuations constantly operating on trade and commerce, influencing prices, supply, and consumption; and every one should observe the improvements that are made in the arts and sciences that relate to his particular business. For it is not to be disputed, that all other things being equal, those who are best informed, with the same extent of industry, are to be most successful: And while the manufacturer is diversifying his productions, and lessening the quantity of labor required to make them, the merchant is performing voyages in twenty-eight days, that formerly employed three months, and letters pass between New York and Liverpool with nearly the regularity of a well conducted mail coach, and go with greater speed. The farmer must exert himself also, or be laid under contribution to the more active; while he is neglecting to study the nature and qualities of soils, manures, the kind of grain, plants, and cattle best suited to his circumstances, the most effective manner of employing labor—and economizing time and every thing about him. The manufacturer is calling to his aid a stream of water, or steam engine, and with one or other of these agents, and the assistance of a few women or children, is converting bales of low priced raw cotton into costly cloths; or by employing a few steady men, iron ore into cart wheel tires, ploughs, needles, &c. &c., a few pounds of which will pay for the bale of cotton, barrel of wheat, or barrel of pork—nay, there are cases in which this will be done by a few ounces.

It is somewhat remarkable that there are few distinguished and celebrated farmers or planters, in comparison with tradesmen, engineers, and manufacturers. The truth is, the profession of husbandry, although it can be carried on in some way or other by most men, is one of the most intricate and diversified; influenced by causes, the laws of which are hardly known;—for example, of vegetation, the manner in which manure acts, the operation of lime, gypsum, &c. and the nature of soils, the grains and plants most suitable for soils and circumstances of the farmer, the seasons, the weather, the habits of plants, the nature, effects, and habits of insects, the grains, grasses, fruit trees, the adroit skill to secure the proper moment for sowing, harvesting, ploughing, and the innumerable operations and occurrences of a farm, influenced as they are by the vicissitudes of weather, and the talents to understand all that relates to these constantly operating causes, with the power to make the most of them, are more rarely concentrated in one person, than the knowledge and

capacity to be eminent in the other professions—this, and the diffused position of farmers, form some of the causes to which may be ascribed the circumstances of there being few pre-eminent farmers.

But it is evident that this all-important business has now entered upon a new epoch, and which is manifesting itself in more attention to the selecting of good seed, new articles of culture, whereby the rigors of winter are equalized with the food of summer—better breeds of cattle, and above all, by the number and excellence of the treatises and periodicals that are published in this country, and Great Britain, and to which every farmer should attend, and be especially careful to see that his sons read and reflect on the subjects they treat on.

J. R.

Philadelphia, January 1, 1840.

NUMBER OF SILK-WORMS' EGGS TO THE OUNCE.

Dandolo's statement of the number of silk-worms' eggs to the ounce is generally received as correct; and doubtless it was so, as stated by that very accurate experimentalist. But as there is no certainty whether the English translation of his work, which is from the French translation of the Italian, means the weights and measures of Milan, of France, or of England, the author's most correct statistics are rendered false, to our comprehension, or at least doubtful. According to this very incorrect translation, the number of eggs of the "common kind" of silk-worms to the ounce, is 39,168—and is therefore in round numbers generally estimated at 40,000.

Having ascertained by sufficient scrutiny that Dandolo's numbers, weights and measures, are falsified by the ignorance of his translators, (by their omitting to state when and what they have changed, and what left unchanged,) and considering that it was very important to know the true numbers of eggs to the ounce, we lately counted, with some careful assistants, the numbers that will be stated, and weighed them by very accurate scales and weights. The small weights (1 to 100 grains) were Professor Millington's, made for the nicest experiments, and the avoirdupois weights were new, of best quality, and tested by standard weights and found accurate beforehand. 437½ grains are equal to one ounce avoirdupois, by the comparison of these weights, as well as by rule.

No. 1.—2000 eggs of early crop of "hardy gray and white" silk-worms weighed 24¼ grains, = 82 eggs to the grain, and to the ounce, - - - - - 36,082

No. 2.—2235 eggs of same hatching, but another person's rearing, 25¾ grains, = 86 eggs to the grain, and to the ounce - - 37,585

No. 3.—2620 eggs of same kind, but also of a different person's rearing, 30½ grains, = 86 to the grain, and to the ounce - 37,582

No. 4.—1060 eggs of same kind, but of still another rearing, 12 grains, = 85 eggs to the grain, and to the ounce - - - - - 37,396

No. 5.—4000 eggs from a second brood in the same season, of a single female of the above, No. 1, (but all gray worms,) 47 grains, = 85 eggs to the grain, and the ounce - - - - - 37,234

No. 6.—4800 eggs of small "pea-nut" cocoon silk-worms, (Whitmarsh's stock,) 51 grains, = 94 to the grain, and to the ounce - - - - - - - - - 41,176

No. 7.—5000 eggs of "two-crop white" cocoon silk-worms, 52 grains, = 96 to the grain, and to the ounce - - - - - - - - - 42,066

No. 8.—1400 eggs of Tisam silk-worms, (a rare kind recently imported from China, which makes a large white cocoon,) weighed 15½ grains, = 90 eggs to the grain, and to the ounce - 39,516

It will be seen by the above statement, that there is a remarkable agreement of the weights of the samples of eggs numbered 2, 3, 4, and 5, and yet a considerable difference from them in No. 1, though from the same kind and stock of worms. This difference caused a mistake to be suspected, and therefore the first quantity (No. 1,) was counted and weighed a second time, and found correct.

SALE OF FLOWERS.

From the Newburyport Herald.

It appears from statistical information in the French Agricultural journals, that the land cultivated around Paris, as kitchen gardens, yields an amount of nearly eight millions of dollars, annually, and maintains half a million of persons. The flowers and fruit produced there, yield also several millions of francs. About two hundred flower gardeners reside at Paris and in the neighborhood, and supply the markets of the capital. There are days, especially the eves of grand fetes, when the sale is very large. H. Hericart de Thury, affirms that on the 14th of August last, $10,000 worth of flowers were sold in Paris, and that, in the depths of winter, certain grand *soirees* give rise to sales amounting to between 1,000 and 4,000 dollars. In the same season, bouquets of natural flowers are despatched, in tin boxes, not only to the remotest towns, but even to Munich, Vienna, and other distant foreign ports.

MISCELLANEOUS REMARKS AND SUGGESTIONS ON ROOT CULTURE. EXPERIMENT IN FEEDING MANGEL WURZEL TO MILCH COWS.

Subject continued from p. 724, vol. VII.

To the Editor of the Farmers' Register.

I am induced, thus early, again to trespass on your columns, on the subject of roots, from various indications I perceive manifested by Virginia farmers to enter on their culture, and to test their merits. In the present comparatively improved state of agricultural science, and of the means now within the reach of every individual to obtain possession of the new lights the last ten years have disclosed, it would argue profound ignorance and neglect in not embracing one of the most obvious means of improvement, which has done so much for other countries, and must eventually produce the same results here. I am quite sure that no misgivings need be entertained about the climate. Nine years' steady culture, without a failure, in lat. 41, has convinced the writer of its excellence, and he thinks, on the whole, it is superior to either England or Scotland; and any where north of James river, and probably in the southern states, the same results may be obtained, regulating the time of sowing to the latitude. In my former communication on roots, was stated generally the mode of culture practised by the writer. He now proposes to offer some suggestions on the best mode of preparing the land for a crop of either turnips or mangel wurzel, time of sowing, the proper distance at which to drill the seed, selection of roots for seed, together with the result of an experiment in feeding mangel wurzel to milch cows, and some observations, which it is hoped may have a tendency to induce many of your numerous readers to become root growers. I am quite sure that no farmer can winter cattle with advantage without the aid of succulent food; nay, I will venture to add, that no man ought to be the owner of horned cattle or sheep in this rigorous climate, if he neglects to avail himself of this rich provision of nature's bounty, evidently designed by a kind providence for the comfort and health of the animal creation, and finally of mankind. Calves intended for steers scarcely ever recover from the effects of a five months' diet of straw and stalks. Let any individual select two spring calves of equal age and constitution—suffer one to run in the usual way, having as much sweet hay as can be eaten—give the other in addition to what hay will be consumed, half a bushel of turnips, the day from grass going to grass coming, or from 1st November to 1st May—and then, if the turnip-fed calf is not a year in advance of the other, with respect to condition, size, &c., and, moreover, delightful to look at, and creditable to the owner, then I will say that all my reasoning must be taken at a considerable discount.

In speaking of the turnips I wish to be understood as referring exclusively to the purple topped Swede, or ruta baga. Every other known variety (fifteen or sixteen in number) has been grown by the writer at one time or another, and finally rejected, and however useful some may be for early fall feeding of ewes and store cattle in the mild climate of Great Britain, they are utterly worthless here. Of beets there are many varieties, red, white, green, and blood-colored. The white is the sugar beet of France; mangel wurzel is a hybrid beet, far superior for cattle to all the rest, and exhibits when cut transversely circular rings of red and white, very crisp, and grows very much out of the ground. This is the true kind, and well worthy of all care and of the best preparation. But to my subject. *Sod* is, or ought to be, with few exceptions, the foundation of every crop, and that is precisely what the turnip wants; on which I would haul, in the month of April, 15, 20, or 25 two-horse loads *long manure* per acre, according to the condition of the land, spread broadcast as evenly as possible, and then ploughed. If the manure was old or in a finely divided state, or what is commonly called short manure, the land should be evenly and deeply ploughed first, and then the manure applied, together with 40 bushels carbonated lime per acre. Turnips delight in a calcareous soil. Presuming the land to remain idle, no further working would be necessary, excepting weeds make their appearance more than common, until the 1st July in this latitude, the 10th for Virginia, when the spring furrow should be reversed, bringing the manure to the surface, (if under,) harrowed severely, and left until the time of sowing, which here ought not to be thought of until the 10th of July, or thereabout, just as you may be ready, 10 days later in Virginia, middle of June in New York state. Then let the ground be again harrowed, and proceed afterwards, as stated in your December number. If it is designed to apply concentrated manure in addition, let it be scattered or drilled along the small furrow on the ridge left by the coulter of the drill, previous to passing the roller over. A light one-horse roller is here meant, six inches diameter, four feet long, taking two ridges at once; this is a very important operation, for, if the soil is not very compact about these small seeds, and dry weather follows, there is great risk of their coming up evenly. Independently however of that consideration, turnips delight to strike in a soil made tolerably solid. South of New York there is not the least necessity that the land should remain idle. A very valuable crop can be taken between April and July, ameliorating and cleansing in its nature. I mean the common field pea, white or gray, sown broadcast per acre; they will be off early in June, affording ample time for future operations. Twenty bushels per acre may reasonably be expected, which would defray all the expenses of the turnip crop. My turnip ground the past season afforded me a fine crop of oats cut green on the 20th June, and made into hay; but the roots being in full vigor gave me considerable trouble in preparing the land for the drill, so much indeed as deterred me from again pursuing the same course. Peas are the thing. The foregoing remarks apply to mangel wurzel, excepting the season of sowing, and that no previous crop can be obtained. The time for sowing in this latitude I believe to be about the 1st June; but take care to have them "any how," for they are a treasure. I have a word or two to say respecting the distance at which turnips and beets ought to be drilled. Any thing short of three feet will not answer, and even at that distance it is almost impossible to give them the requisite tillage, if the preparation is good. Twenty-seven inch-drills are very general in Norfolk and in Scotland; but in the United States, where the foliage on green crops is double in

amount, narrow intervals are inadmissible. Your excellent correspondent, J. M. G., esq., of F., thinks two feet ridges might do, "*if straight.*" I will venture to add, that whether straight or crooked, whoever attempts it will soon discover the necessity of wider intervals. I have had the leaves of turnips to measure three feet frequently, before the bulk was much larger than a goose egg. If such plants were in two feet ridges what would become of them? Evidently enough, they would be smothered. The majority of green crop growers that I have seen in this state commit a fatal mistake in not paying due attention to the season for sowing. You may as well expect a crop of winter wheat sown in May, as a crop of turnips sown in this latitude the middle of June. People read of large crops grown in the north and in Europe, and sow accordingly, without reflecting, for a moment, in what part of this vast country they are. By sowing in July we can obtain as large and as handsome roots as can be produced in the other hemisphere sown in May. One of your subscribers, an excellent farmer, Mr. C. O—n of Princeton, in this state, harvested a most splendid crop the past season, many roots weighing 13 and 14 lbs. each, sown on the 7th July. (Allow me here to remark that the larger ruta baga turnips grow the better they are, provided they have small necks.) Other people's turnips again, near neighbors also, on land of similar formation and quality, who sowed in June, were worthless, and yet, notwithstanding this evidence of the impropriety of early sowing, many individuals, admirable executive farmers in other respects, persist in endeavoring to counteract the laws of nature. Finally, turnips sown early produce too much foliage, and soon after they have commenced bulbing make an effort to seed, which is fatal to their future growth. From that moment the bulb *ceases to grow*, and the whole plant becomes fibrous, and comparatively worthless.

COTTON SEED.

From the Carolina Planter.

After the encomiums I have passed on cotton seed as a manure, you would hardly expect from me what I am going to say now—but a man may pay too dear for his whistle, though it be never so good a one. It is the practice of many planters to purchase cotton seed at high prices, for manure. It is said that 10 cents is as much as can be given for it to make oil of, and that the profit is not large at over 6 cents per bushel,—yet I have heard of planters giving as high as 20 cents a bushel, and then hauling it for manure. Fifteen cents is common, and 12½ considered, I believe, very reasonable.

Now let us enter into a few calculations. Supposing that a piece of land without manure would produce 12 bushels of corn per acre, it is a very fair allowance to suppose that with the assistance of cotton seed it will produce 20, or eight bushels more from the seed—I have not in general made more than five. If it will take fifty bushels to manure an acre, and to make this product it certainly must—the cost of the seed at 12½ cents per bushel, will be $6 25. If it is purchased within five miles, the hauling and putting it on, both together, cannot be worth less than $1 75—making the whole cost $8 per acre. Now, in many parts of the country, an acre of excellent land may be purchased for $8 and less—land that will bring more than 12 bushels of corn per acre. If the planter can sell his increase of 8 bushels of corn at $1 per bushel, he will be just reimbursed for his expense in manuring, as the increase of fodder, peas, &c. will about pay him for the trouble of gathering, housing and selling the corn. But it will allow him no profit for his trouble and no interest on the money laid out. He would hardly be wise to continue the practice. But what planter can expect to get $1 a bushel at this crib for corn every year? It has, like every thing else, been very high for a few years back—but at this moment the average price in the state cannot be more than 60 cents. I do not suppose that any planter would refuse to make a contract to sell for 20 years to come, what he makes to spare, at 62½ cents *at the crib in cash.* I would myself prefer raising corn at that price, to making cotton at 12½ cents--much prefer it. At 62½ cents the increase of 8 bushels of corn would be worth but $5—Yet the planter has paid $8 for the manure to produce it. The remaining $3 he must expect to realize in the *permanent* improvement which his lands are to derive from the manure; but it is thought, as I have already mentioned, that little or no permanent advantage is derived from cotton seed, and that it is nearly absorbed by the first crop. Admitting, however, that it is improved, as I am free to say I think it is—and after ten years of successive manuring with cotton seed, it will produce the 20 bushels without manure for ever after—which, by-the-by, is an extravagant admission—at this rate his land will cost him first the original price, say $10; next the $3 per annum devoted for 10 years to permanent improvement, or $30; and then the interest on each instalment of this sum compounded, which, at 7 per cent. would, of itself, amount to $14—making the whole cost of the acre, at the end of ten years, fifty-four dollars.

Now, sir, for supposing me to be *half right*, would it not be better to purchase ready made land, of the rank of 20 bushels per acre at once? In what section of the plantation states would such land cost $27, much less $54. And do not those planters who pursue this course, while they are taking great credit to themselves for resuscitating their lands and enriching the state, really impoverish without benefiting any one except those who sell the seed. Are they good citizens who lay out on the acre of land $54, or even $27, that is not worth more than $15 at the utmost, after that expenditure, thus actually sinking the balance to themselves and to the country. The period has not yet arrived for such a system of agriculture—when the density of population shall make land of this description worth from $27 to $54 per acre, and the permanently established price of provisions or cotton will enable its owner to make a fair profit on an investment at that rate—then cotton seed will be *worth* 12½ cents a bushel for manure, and not before. Then we can afford to buy manure—and, as the people do in Europe, send out into the highways to collect it—then we can use lime, and marl, and plaster of Paris, &c. &c., but until then, he who indulges in such extravagance beyond the limits of his garden or his turnip patch, is injuring himself, and so far injuring his country.

SHORT STAPLE.

POISONED CHEESE.

The following communication from Dr. Fansher appears in the Hartford Courant:—"I understand that a large family in Simsbury have been poisoned by eating cheese which came from New Orleans, of which every member of it perished; and having recently returned from a tour to the west, I have thought it my duty to state what I heard relative to the milk sickness districts, viz:—that the beef, butter and cheese, as well as the milk of the cows which feed in the woods, were deadly poisons to those who partook of them, and that persons in that region dare not make use of either; but that they are in the habit of sending what they dare not eat to New Orleans, where it is sold to merchants, who are not aware of the criminal fraud, and suspect not that they are dealing in a deadly poison."

CHEAP MANURING.

From the Maine Cultivator.

Many farmers in this state of late years have adopted the practice of manuring their land for wheat the ensuing season, by turning in green crops. For instance, take a field when the grass upon it is about fully grown, say the first of July, and turn it nicely over with the plough. Then harrow and sow with buckwheat. In four or five weeks, that is by the middle of August, this crop will have attained its growth. Turn this under with the plough, as you did the grass before. These two green crops thus ploughed under, bring to the soil much manure from the green haum acquired from the atmosphere. They create an active fermentation, make the soil light and pliable, and manure it more than if the same had been cut in the form of hay and fodder and given to horses and cattle in the barn. It is on the whole an excellent mode of enriching soils, which will ordinarily produce good wheat the next season.

THE DOMESTIC COCOONERY.

From the Journal of the American Silk Society.

It is expected that during the season of 1840, great numbers of persons will desire to try experiments in feeding silk worms, and to enable them to do so upon the most economical plan, we have prepared the following directions for fitting up and conducting a domestic cocoonery. Entire confidence may be placed in all the estimates and calculations, as they are founded upon the results of actual and judicious practice, both of European and American culturists. The editor of this Journal has been able to establish a set of simple principles or elements, deduced from the practice above alluded to, of numerous individuals, which will enable any person to make his calculations without difficulty, viz:

1st. The average weight of leaves that each morus multicaulis tree will afford during its season's growth on land of fair quality, and the trees planted four feet by one apart, is *one pound.*

2d. The average quantity of leaves consumed by each worm during its life, is *one ounce.*

3d. The space of shelf occupied by the worms, is as follows:

During the 1st age,	1,000	worms	occupy	1-3	of a	square	foot.
" 2d age,	"	"	"	3-4	"	"	
" 3d age,	"	"	"	2	square	feet.	
" 4th age,	"	"	"	6	"	"	
" 5th age,	"	"	"	18	"	"	

4th. Three thousand worms will make one bushel of cocoons.

5th. One bushel of cocoons will make one pound of raw silk, ready for market.

6th. One pound of cocoons will produce one ounce of eggs.

Thus, 1,000 trees will feed 16,000 worms the first year; these will require 288 square feet of shelf, or 8 shelves, 12 feet long and 3 feet wide. They will produce 5⅓ bushels of cocoons, or the same number of pounds of merchantable raw silk.

These simple elements, and all calculations founded on them, it must be borne in mind, refer exclusively to the *natural system*; that which all persons will practise in a domestic cocoonery.

Any common room may be used for the cocoonery. It ought, however, to have one or more windows on each side, and if it have a fire-place, it will be all the better for it. The second story of the house will be better for the worms than the first, though it is not so convenient for the attendants. If it be desired to fit it up temporarily for the cocoonery, the following plan will answer every purpose, without the least injury to the walls, or any thing else; and after the cocoons are gathered, the shelves can be removed, and the lumber used for other purposes.

Suppose the room to be 20 feet long, and 16 feet wide. Make three trestles, such as carpenters use, out of scantling, 3 feet long, one foot high, with four legs. Set one in the middle, and one near each end of one side of the room, and lay upon them 3 planks, 16 feet long and 1 foot wide; thus making a temporary table, 16 feet long and 3 feet wide. A tin-pan can be placed under each foot of the trestles, to be kept full of water to prevent ants and other vermin from getting upon the shelves. They can be obtained very cheaply at every tin-shop, and are effectual preventives of such evils. A second shelf may be placed upon the first, by fixing the trestles directly over those below, and a third, fourth, fifth and sixth in the same way. The trestles should be made to stand firmly and level, with the legs expanded, that they may act as braces to steady the range of shelves. The plank need not be nailed down, if it be an object not to injure them; but the shelves would be more steady and firm if this were done. In setting up these shelves, a space ought to be left between them and the wall, to prevent ants, &c. getting upon them from that quarter; a few inches will be sufficient. In a room of the above dimensions, then, we shall have three ranges of shelves, 16 feet long, 3 feet wide, with an alley of 3 feet between each range, &c. and a space at each end, to pass freely.

If we put 6 shelves in each range, we shall have 18 shelves, 16 by 3 feet each, and these will contain 48,000 worms. The plank shelves should be covered with old newspapers or any other waste paper.

The management of the silk worms on this plan, may be as follows: Expose the eggs to hatch in the usual manner. Pay no attention to those that hatch the first day. Those that hatch on the second day, should be placed on the first range of shelves; those that hatch on the third day, on the second range; and those that hatch on the fourth day, on the third range. Pay no attention to the few that hatch after the fourth day, they are too dilatory to be profitable. The young worms are very easily removed from the hatching table, by laying small mulberry leaves upon them, and when they attach themselves to them, take each leaf by the stem, and lay it on the shelf where you want the worms. Feed the young worms by laying on them a few fresh leaves four or five times a day, or oftener, if they consume them, or the leaves become wilted. During the first age, if the leaves are large, they may be torn, or cut into small pieces; but if you have plenty of leaves it is not necessary. After they have moulted the first time, lay on leaves, and when the worms become attached to them, lift them by the stems and lay them on a clean place on the shelf, allowing them about three times as much space as they occupied before. You may then clear off the shelf previously occupied by them. The same operation may be performed after the second, third and fourth moultings, extending the space they occupy each time, as in the first, and clearing off the litter in the same way.

In feeding the worms, from the beginning to the end, it is of importance that they be fed often and in small quantities. If you lay on too much food a considerable portion will be wasted; but that is the least consideration—the shelves will become loaded with rubbish, which will render it necessary to clear them often. We have always found it to be a good plan to keep the attendant continually feeding—always passing along the shelves with a basket of leaves, and whenever any of the worms are found without food, or nearly so, lay on a few leaves, and thus keeping them continually eating fresh leaves. We know it is the practice, almost universally, to feed at stated times—three times a day, or four, or five, and to weigh the leaves, giving at each feeding a certain quantity; but all our experience goes to prove its impropriety. Late at night a full supply of leaves, according to their age, ought to be given them, that they may have plenty during the night. Strange as it may appear, many persons suppose the worms do not eat much at night; the truth is, they eat rather more at night than in the day-time, as do all caterpillars; and they ought either to be fed occasionally during the night, or have a supply given them over night sufficient to last them till morning.

Wet leaves should not be given to silk worms, nor those having sand or dirt on them. If it cannot be avoided during long rains, necessity of course will compel the feeding with wet leaves; and generally this may do no harm; but I have seen very large quantities of worms destroyed by it. It should always be avoided, if possible.

The moulting of the worms will occur four times, but unless closely observed, and the several days' hatching have not been kept carefully separate, these changes will be scarcely noticed. The times of moulting vary, according to the treatment the worms receive. If fully fed, and a proper temperature be kept in the room, they will moult about every 5 or 6 days; if a contrary practice be pursued, they may do so every 7, 8, or 9 days. If each day's hatching have been kept by themselves and they have all been properly fed, all the worms of one hatching will generally moult about the same time, and they should not be fed while they are in the moulting state. They generally remain in this state from 18 to 36 hours. As soon as they revive they should be fed as above directed, with large leaves, or even branches, and as soon as they attach themselves to the leaves, they should be removed to a clean shelf. It is frequently the case that only a part of them moult one day, and the balance the next. In this case the two moultings should be carried to separate shelves, and thus be kept separate in future, as they will otherwise not spin cocoons regularly. As the space occupied by the worms must necessarily be extended as the worms grow, the most convenient time for doing it is after each moulting. And if this be properly done, all the worms on each shelf can be made to spin at the same time, and thus save the attendant much inconvenience. To effect it all that is necessary is to separate the several days' hatchings, and at each moulting to collect all that revive at one time, and place them by themselves. Those who observe this precaution will be well paid for their attention.

After the fourth moulting, if you have plenty of trees, and do not care about the cuttings, you may cut off small branches with the leaves on, and lay them on the shelves. In feeding in this way, you can save much time, the leaves keep from wilting longer, and more worms can be accommodated on the same space. The branches should be laid first across the shelf, say six inches apart; at the next feeding they should be laid lengthwise of the shelf; and the next, crosswise again, and so on alternately crosswise and lengthwise at each feeding, so that the pile may form a mass of crib-work, affording a free passage for the air, and accommodation for the worms, into which they will descend, to form cocoons. The objections to this plan are, that in damp weather the mass of rubbish and dung of the worms, is apt to ferment, and thus produce disease; and also the loose tow of the cocoons is lost, as it becomes so filled with dirt and fragments of leaves, that it is not worth saving. It is believed, however, that the value of this tow is less than the trouble of the ordinary fixtures for the worms to spin on is worth. The writer of these remarks, raised his silk worms one season on this plan, and the cocoons produced were equal to any he ever raised. Care should be observed in feeding in this way, not to lay on so many branches as to raise the pile too high; as, if it approach near the bottom of the shelf above, before the worms are ready to spin, it will be very inconvenient to feed them. Not more than four or five courses of branches should be laid on each day, and the intermediate feedings should be with clear leaves, so that the pile may ascend not more than an inch and a half each day, and that the height of the pile on the shelf when the worms begin to spin may be about nine or ten inches. If, however, the pile should get too high, or if it gets damp and mouldy, the lower part can be easily removed by passing a couple of smooth sticks through the pile two or three layers below the worms; and by means of these, gently

raise the upper layers with the worms on, and remove all below. We found no difficulty in cleaning our shelves in this way.

During the whole time the worms are feeding, attention should be paid to cleanliness—that is, the room should be kept free from filth and bad smell. In very hot weather, the windows should be opened to give free air; and in cold damp weather, if it can be done, fire should be kept in the fire place. It is proper to observe, that unless the weather be very cold, no other injury will be done the worms than stopping their feeding and growth during its continuance. We have had weather so cold as to produce thin ice in our cocoonery, without other injury to the worms, than stopping their growth a few days, that is, it required two or three days longer to produce the cocoons than it would have done, had not the cold weather occurred. Therefore, though it is always better to keep the room moderately warm, by fire, if necessary, yet it is not indispensable to very fair success.

If disease occur in the worms, particularly the yellows, the best way is to take the sick worms from the shelves, and throw them away as soon as they are discovered. The yellows is both a contagious and hereditary disease; and hence, if one worm is attacked by it, it will be sure to be communicated to the others; and, worse than this, even if the sick worms get well, which they seldom do, the eggs they produce are almost certain to produce sickly worms, and, by this means, the crop of the succeeding year will be lost.

When it can be done, one or two days' supply of leaves should be gathered ahead, and kept in a cellar, that no damage may be sustained during rainy weather. But great caution should be observed not to feed with *wilted* leaves. It were better to give the worms wet leaves than wilted ones. If kept in a cellar and occasionally shook about, the leaves will keep three days in good condition. Where no cellar is at hand, and where you have plenty of trees, you can keep leaves fresh three or four days, by cutting off the tops and branches of the trees, and setting the but-ends in water. If the end of a branch be set in water one inch deep it will keep the leaves fresh. For this purpose, tubs might be used, and large quantities of leaves kept in this way.

The sun should never be allowed to shine on the worms; and if any of them are exposed to it, the window should be so shaded by shutters or blinds as to prevent it.

Successive crops may be fed, if it be desired to occupy the whole season, by keeping the eggs in an ice-house, and bringing out portions of them at each time of hatching. It is believed, that this is a much better plan than commencing with the whole at once. All new beginners should commence in the spring, with one-half an ounce of eggs, to be hatched as soon as the leaves put out. From the cocoons formed by this crop, eggs for next next year's use should be saved, and reelers should be taught. The very best cocoons should be selected to produce eggs. A ready calculation of the number required, can be made by dividing the number of eggs you want next year by 150. Thus, if you want 100,000 eggs next year, divide 100,000 by 150, and the result will be 667 cocoons required for eggs. Let these not only be the best cocoons, but be certain that they were the product of healthy worms. Attention to this is one of the most important requirements of the art of silk making. And it is a matter of much regret, that it is not sufficiently attended to. Those who make a business of selling eggs, are too much in the habit of selecting their best cocoons for making sewing silk, and leave the rubbish cocoons, and those formed by sickly worms, merely for producing eggs—*to sell*, not to use themselves, for they know the value of them too well. Hence, in purchasing eggs, the utmost caution should be observed in obtaining assurance of their quality. The balance of the cocoons of the first crop, may be used in teaching the reeler to reel.

Many persons of course, have no ice-house in which to keep the eggs for successive crops. A very good substitute may be obtained in the use of a well.

A deep cold well will preserve the eggs from hatching as well as an ice house, if they are placed in it at the proper time. If access to the well be convenient, the best way is to descend to near the surface of the water, take out a few bricks or stones from the wall, so as to make a place large enough to contain the box containing the eggs, and place it there. If there be a pump in the well, the box will remain there securely. If not, of course, caution must be observed in drawing water, not to allow the bucket to interfere with the box; and the place prepared for it, should be on that side of the well least exposed to the dripping in drawing up water. It is also said, that a deep hole, say ten feet deep, dug in the ground in some shady place, the box of eggs placed at the bottom, and the top covered with plank, has preserved eggs in excellent condition. I have never tried this; but if the temperature in such a place be at or below 55° it will answer the purpose; the coldness of the place, no matter what place it may be, is all that is required. But as we have so often remarked, the eggs must be put in the cold place before the germ has commenced; if not, even the coldest ice-house will not prevent their hatching at or about the regular time in spring. The eggs ought to be put in the cold place during the winter, before they have been exposed to warm weather. If thus preserved, portions of them may be hatched at any time during the summer, and thus successive crops may be raised. The advantages of successive crops are these. A room that will only contain 48,000 worms at one time, can be made to accommodate that number SEVEN times during the summer, by hatching a crop every three weeks, and keeping the young worms by themselves till the old ones spin their cocoons, and thus 336,000 may be raised during the summer. One person can attend to them, except occasionally, in clearing the shelves, when more help for an hour or two will be required. The person thus employed steadily through the season will become better acquainted with the business, than could be the case if only one crop were raised.

As soon as the worms have formed their cocoons, that is, *four days* after they begin to spin, the cocoons should be gathered, and the loose tow and filth stripped off as they are taken from the branches. The cocoons may then be reeled, or must be cured. The process of reeling, has been fully described in this Journal, and needs not be repeated here, as also has the process of curing the cocoons. Once more, however, let us urge upon all persons the propriety of reeling their own

cocoons. They will obtain several important advantages by it. They reduce the bulk of their product from a very large, to a very small compass—no small object to those who reside at a distance from market. They also obtain the profit of reeling, which is nearly or quite equal to that of producing the cocoons. Let no one for a moment indulge the idea that they cannot learn to reel silk. Any intelligent person can learn in a week or two, to perform the operation, and in one season, become sufficiently skilled, to produce the finest and best quality of raw silk. All who make the experiment of feeding worms, should appoint some active, intelligent young woman to reel, and the first cocoons made in the season, should be appropriated to her education as a reeler. She will become sufficiently expert with the cocoons of the first crop, to teach others with those of the second; and thus they will be able to reel the whole, nearly as fast as they are produced. This can be done, and should be done. Foreigners, we know, make a great noise about the difficulty of reeling; but we also know, that hundreds of American females have learned to reel in a few weeks, and produced silk equal to any ever produced in Piedmont. Indeed, we know of aged persons who have even *made the reel*, and learned to use it perfectly from the directions given in this Journal. Their only surprise was, after a fair trial, that any one should ever have invested the art with any difficulty. The extreme fineness of the fibre, to an inexperienced eye, seems to be beyond the reach of the sense of touch; and its apparent delicacy to the same observer, would seem to be incapable of withstanding the rapid winding off required in reeling. The fibre is so fine, that it can scarcely be seen, and so delicate, that it would be supposed to break at the slightest touch. Hence, every body on a first view supposes the art of reeling so very difficult. And yet all these difficulties vanish at the first fair trial; and all that is really necessary for a beginner is RESOLUTION TO BEGIN—let her take resolution to say "I WILL," and she SHALL be a reeler. Reeling silk is much more appropriate to females than to males. The very delicacy of the fibre, and the lightness of the operation, indicate that the more delicate fingers of females should perform the operation. Let every experimenter in raising worms, therefore, also try the experiment of reeling, and in this way will reelers be created all over the country, and thus will a market for cocoons be established in every part of the United States.

The writer of this paper has already extended it to a greater length than he intended, or perhaps is advisable for the object. But he desired to say all that need be said on the subject, that the inexperienced reader, for whose use it is exclusively intended, might be able to try an experiment with all the advantage possible. Hence, many small things have been spoken of—trifles light as air to the practised eye—but none the less important to a successful experiment. As before remarked, this paper is intended for small domestic practice, not for large systematic cocooneries. The latter will undoubtedly build and fit up cocooneries expressly for the purpose; and for such, we have already published full and detailed directions. G. B. S.

ROCKY MOUNTAIN FLAX.

From the Albany Cultivator.

We know of no plant which seems to better deserve an effort for its introduction into the class of cultivated vegetation, than the one above named. The common flax plant is an annual; is exposed to the depredation of many insects; to get the full amount of the crop it is necessary it should be pulled, and yet with all these drawbacks, it is a valuable crop, and indispensable for many purposes. If a plant possessing the same valuable qualities as the common flax, yet which would be perennial, and could be cradled or mown at maturity—(thus giving an annual succession of crops from the same root)—could be discovered and brought into use among us, and particularly in the fertile valleys and prairies of the western states, the advantages would certainly be very great. Such a plant is the flax of the Rocky Mountains; and the individual or the society that shall introduce it into cultivation, should it answer present indications, will be considered as benefiting the agriculture of the country essentially. Of the various notices which we have seen of this plant, we select the following, as more particularly describing its appearance and the extent of its growth in those regions.

Mr. Parker, in his excellent narrative of his journey across the Rocky Mountains, from the Mississippi to the Pacific, says, "Flax is a spontaneous production of this country. In every thing, except that it is perennial, it resembles the flax that is cultivated in the United States—the stalk, the bowl, the seed, the blue flower, closed in the day time and open in the evening and morning. The Indians use it in making fishing nets. Fields of this flax might be managed by the husbandman in the same manner as meadows for hay. It would need to be mowed like grass; for the roots are too large, and run too deep in the earth, to be pulled as ours is; and an advantage that this would have, is, that there would be a saving of ploughing and sowing." This was on a branch of Lewis or Snake river, of the Columbia.

In a late journal of a passage across these mountains by Mr. Oakley, of Illinois, under date of the 21st of July, 1839, occurs the following: "Encamped to-night in a beautiful valley, called Bayou Selard, 28 miles from the head of the south fork of the Platte. It is a level prairie, thirty miles long and three wide, and was covered with a thick growth of flax, which every year springs up spontaneously."

Whether the Rocky Mountain flax will prove to be as near the common flax as is supposed by Mr. Parker, may be doubted; but that it is unlike and far superior, to the two or three kinds of native wild flax that have before been discovered in the United States, would also seem to be clear. A tract of 90 square miles of flax, such as Mr. Oakley described, would be a sight in any country, and would rival the grass covered prairies of Illinois.—

LARGE SEEDLING GRAPE RAISED BY VAN MONS.

A seedling grape vine, at Brussels, raised by Van Mons, produces fruit as large as a green gage plum, which, at the latest, ripens in the first

fortnight of August, and never fails. Its qualities are no less remarkable, as it is both solid and sweet.

SHORT HORNED CATTLE.

Never think of buying short horned or Durham cattle, until you are prepared to keep them well. They need an abundance of fresh pasture, and therefore to be frequently changed from one pasture to another, in succession, and plenty of food and good shelters in the winter. Thus provided for, they are valuable stock. But neglected in these respects, they are no better than native cattle.—*Franklin Farmer.*

CAPTURE OF A BEAR.

From the Bangor Democrat.

For the last twelve years, there has been residing within forty minutes' ride of this city, in the town of Brewer, near the "Big Pond," so called, a mischievous animal called a bear, of the hog species, with a brown proboscis, and short, but strongly sinewed legs; during which time, he has fattened upon the corn, cattle and sheep of the farmers who lived in his vicinity. During the past year alone, he has destroyed upwards of one hundred dollars' worth of stock, always taking care to secure his retreat when pursued, till within a few days, when he was accidentally discovered by some men who were employed in logging near the spot where he had taken quarters for the winter. Observing his tracks in the snow, they traced him to the mouth of his den, which was in the cavity of a ledge; when they commenced removing the brush he had carefully drawn into its mouth.

In a moment old Bruin began to snuff and growl, and made an attempt to take leg bail, but was saluted with a blow from a cudgel, cut for the purpose, and fell back into his domicile, where he quivered for a few moments, but suddenly regained his strength, and made good his escape for the time being. The next day he was hotly pursued by some half dozen of those on whose stock he had preyed, and the chase was continued for some five or six days, when Mr. Blood came to this city and informed some of our sportsmen (we have some old ones too,) who, accompanied by their hounds, immediately joined in the chase, and fifteen days from the time the bear was first started from his den by the loggers, (during the whole of which time he was hotly pursued by men and dogs, having been kept on the tramp the whole time, only excepting nights) he was captured and brought into this city by Capt. Nye, and Mr. Leonard Dow.

On examining him, thirteen balls were found to have pierced him; the last shots, however, were those which gave him his *quietus*—one of which took effect a little abaft his fore shoulders, and the other near his spine. During the whole fifteen days, Mr. Blood, who is a farmer, kept open house, keeping all of those free of expense who were disposed to join in the chase, being determined to have the bear before he gave up. He weighed, when killed, three hundred and twenty-four pounds. The old hunters say he must have "run off" one hundred pounds during the chase—but still he is a lusty fellow, and you Bostonians may prepare your mouths for a taste of his flesh, as I understand it is the intention of Mr. Dow to ship him at Frankfort for your city. He has been on exhibition in this city for the last two days, at 12½ cents a sight.

SPACES FOR SILK-WORMS. MISTAKES OF DANDOLO'S MEANING BY HIS TRANSLATORS.

There is no subject belonging to or connected with agriculture, which, for some years, has employed the pens of so many writers, or occupied so many pages, as instructions upon silk-culture. Besides the hundreds of particular communications from different individuals to various agricultural journals, and the dozen or so of other journals devoted exclusively to the diffusion of information upon silk-culture, there have issued from the American press, within a few years, at least ten several and long treatises, on this one subject. All these publications necessarily contain a great amount of useful facts and valuable instruction; but also, and of course, most of them have much that is either useless, or foolish, or false. There are many particular articles which we should rate very high in value. But, upon the whole, and as a general rule, admitting however of some considerable exceptions, it would seem that the utility and worth of these instructions are in the inverse ratio of their bulk and degree of pretension. It may be said in general that whatever the treatises in the most regular and systematic form have presented of value, was drawn from Dandolo, and the balance is good for nothing. It is much to be regretted, however, that all of the writers who have thus endeavored to copy Dandolo's rules, should have made some gross and great mistakes of his meaning (and doubtless of his language also, if that could be referred to,) so as to involve the whole of their instructions in error.

Arithmetical estimates and calculations are particularly adapted to the business and processes of the rearing of silk-worms; and accordingly they have been so applied very frequently and extensively by Dandolo, and by all his copyists, whether of those who blindly approve and aim to follow, or those who profess to condemn in many respects, and who yet no less blindly mistake their illustrious model and subject. And, as arithmetical calculations, if correctly founded and constructed, and correctly applied, furnish the best of all possible information and of reasoning on any subject, so errors or misapplications of arithmetic serve as much to sustain ignorance and falsehood.

Dandolo's treatise on the 'Art of Rearing Silk-worms,' even when seen in the existing imperfect and manifestly false English translation, (London edition, 1825,) is a work which deserves very high commendation. The practice of the author appears to have combined the accuracy of execution required for philosophical experiments, with a degree of success, and profit of results, which excelled the best of previous or general practical operations. And though, in our finer climate, we may safely and profitably omit much of the care and labor which Dandolo found necessary, still his rules and his facts are of great value for conveying general and correct information; and they form the best directions for practice in the occurrence of any of the difficult circumstances of climate under which he continually operated. If instructions are designed to suit the most favorable circumstances, they will be found wanting in every one of the numerous difficulties which *may* arise even in a generally successful rearing. But if directions are suited to meet the most difficult circumstances, they can be very easily omitted or slighted, when not strictly required.

Dandolo's work uses so much of arithmetic, that it may be considered as presenting fully the *statistics* of silk-worms and their management. For this alone it would be very valuable. But, unfortunately, the French translator from the original Italian work has misunderstood, and therefore mistranslated his author, in some of the most important arithmetical statements; and the errors so made, though as gross as any well could be, have passed, unquestioned and unsuspected, into the English translation, and thence into all the American treatises which have made use of Dandolo's, on what were thus improperly supposed to be his rules. And as the reader, after having been informed of the existence of such errors, cannot tell how far they extend, and whether any and each one of all the denominations and value of weights and measures has, or has not been, changed by either translator, and therefore cannot know whether it be Milanese, French or English, it follows that, even when correct, the stated quantities cannot be relied on as being what Dandolo designed. Hence one such falsely stated fact in twenty serves to render doubtful and destroy the value of the other nineteen, even though they may be truly stated.

The principal and most obvious mistake to which allusion is here made is the mis-statement of the spaces required by silk-worms in their different ages. Not having been able yet to obtain the original work, we are unable to know certainly and precisely what Dandolo himself meant in this respect, either as to the actual denomination of measure, or the number of such measures; but, in the absence of the direct proof which the original work might furnish, there is abundant testimony furnished even by the copyists themselves, that they are totally mistaken as to the meaning of the original, which they have perverted to a ridiculous extent of error, without one of them suspecting it.

The first treatise published in this country was the 'Manual,' compiled by order of the secretary of the treasury, under authority of a resolution of the house of representatives. If the compiler had simply translated and given Dandolo's treatise—or if he had merely copied the existing English translation, with all its errors—he would have done good service. But while taking nearly all his matter from Dandolo, or from his translators, there is thrown in, and without being distinguished, just enough matter of his own, or of others, to damage and discredit the whole. Yet the compiler stated in his preface, that he, "having the use of the original work in Italian, as well as the French translation from which the English version was made, *the errors of the latter were corrected.*" If this was, indeed, done in any important particular, we have not discovered it; and it will be shown, that in the main one above mentioned, the grossest and most obvious errors of both previous translators have been faithfully and fully retained. Thus, instead of directing so many *square feet* of space for certain numbers of silk-worms, the American writer most carefully and studiously, and over and over again, uses the words "*feet square.*" The absurdity of this error ought to have been enough to expose it; but the compiler stuck to it, through the whole writing and printing of his book. It was only after every sheet of the work had been printed, that it seems *some body* first suspected this great and general mistake, pervading and affecting the whole of the calculations and rules, and put it as a *general* erratum in the supplementary list of errors, thus: "In page 175, last line, for 'feet square' read square feet. In other places, the same correction to be made." And this correction is necessary in so many "other places" of the book, that it is certain that the writer had not even suspected his mistake; and neither has his supplementary "erratum" been seen by any of his followers. For others have copied the mistake from the 'Manual' just as heedlessly as the compiler of that work did from a preceding blunderer. We will give a single example of the enormous absurdity of the mistake. The space required for the accommodation of the worms from one ounce of eggs, in their 5th age, is stated to be "one hundred and eighty-three feet four inches *square.*" This is the

square of the number, instead of the number itself of square feet, and is equal to 33,612 square feet, or a surface of feeding shelves, of more than three-quarters of an acre! And yet, obvious as is this error, it is faithfully copied from the English translation, and has been as faithfully re-copied by nearly all the subsequent American authors or compilers.

Clarke, the author of the latest American treatise, (1839,) and the volume of greatest size and most pretension of all, objects to Dandolo's spaces, (or, as we say, those of Dandolo's translator,) as being too small. But he is content however to increase them merely by changing the fractional parts, or the odd inches, to the next greater whole number of feet. With this very slight addition, he constructs and presents a table of his own, upon the same grounds, showing the "*feet square* requisite on the shelves, for worms proceeding from "one ounce of eggs and every intermediate quantity to 10 ounces. Thus, the worms from 10 ounces, in their last age, as stated in this carefully constructed table, require 1840 "feet square;" which would be equal to 77 acres of surface of shelves!!!

But after throwing out this greatest and most glaring of errors, and supposing the *square feet*, and not the *feet square*, to be understood by all, (their words to the contrary notwithstanding,) there still remains another great error in this estimate, which can be very clearly shown to exist, although, without reference to the original, we cannot do more than infer the true sum.

According to the 'Manual,' (which in this respect copies literally the English translation of the French translation of Dandolo, and which is again copied either precisely, or very nearly, in half a dozen American regular treatises,) the "spaces occupied by worms in different ages" are as follows:

"The worms proceeding from an ounce of eggs should have a space,

In the first age,	of	7	feet	4 inches square—
" second		14	feet	8 inches square—
" third		34	feet	10 inches square—
" fourth		82	feet	6 inches square—
" fifth		183	feet	4 inches square."

Now after making the change of these numbers of "feet square" to square feet, (all the correction that the authors *can possibly* claim,) the spaces are still altogether erroneous, and much too small; and if these oft-repeated rules have indeed directed the practice of any young culturist, we undertake to say that he either killed or greatly injured his worms, by their being too much crowded on the shelves.

In Brewster's 'Journal of Science,' there is an article by Murray, which is manifestly founded on Dandolo's work, and operations, and on Murray's personal observation on silk-culture in Italy. (See Brewster's Edinburgh Encyclopædia, art. Silk.) In this he states the spaces required at each different age, and no doubt he gave the very spaces prescribed by and learned from Dandolo. Now these spaces are not stated *by the foot*, but by the Italian measure "*braccio*," which Murray says is "about 22 English inches." Thus he states the spaces required by the worms from an ounce of eggs to be as follows:

During the first age,	4	square braccia,
" second age,	8	do.
" third age,	19	do.
" fourth age,	45	do.
" fifth age,	100	do.

The translator of Dandolo, it is obvious, reduced the lineal braccio to feet, and so the squares of the feet were substituted, for the squares of the equivalent in length, in the Italian denomination, although the result is thereby made altogether different. As there has been so much misunderstanding on this point, I will annex a figure which may be clearly understood, even by all of Dandolo's translators and copyists. It is manifest from these figures that, though 4 braccia, in length, is the same as 7 feet 4 inches, in length, that 4 square braccia is very nearly twice as much space as 7 square feet and one-third.*

Four	square	brac	cia.

Four braccia, lineal measure, equal to 7 feet and four inches.

Seven	sq're.	feet	and		a	third.

Seven feet and four inches square.

* We take as correct Murray's value of the *braccio*, because he doubtless received it from Dandolo, and in the locality where used, and also because 4 braccia in

Now, having ascertained what were Dandolo's prescribed spaces, let us state them in American square feet, opposite the amount of square feet as falsely rendered by his translators, and received, and copied by the 'Manual' and its followers.

Spaces required by the worms from an ounce of eggs.

	Braccia	sq. in.	sq. ft.	sq. in.	English translation of Dandolo and American copyists.
In first age,	4	= 1936	= 13	64	*7 ft. 4 in. sq.
second age,	8	3872	26	128	14 8
third age,	19	9196	63	24	34 6
fourth age,	45	21780	151	36	82 6
fifth age,	100	48400	336	16	183 4

Dandolo says that the number of eggs of the common silk-worm in an ounce, is 39,168. (By the way, the value of his ounce is made even more uncertain than that of his foot measure.) He elsewhere supposes that 120 lbs. of cocoons from an ounce of eggs is a very good product, though he also says that if all the eggs were to produce cocoons, there would be 163 lbs. from the ounce of eggs. This shows that he counts on a loss of worms (or eggs) in the ratio of 10,288 to the ounce, and leaving only 28,288 worms to reach maturity from each ounce of eggs. Therefore, upon these data, the number of worms to each foot square would be as follows:

According to Dandolo's statement (as supposed to be restored above) if all the 39,168 worms lived, or 336 square feet = to the square foot - - - - - - - 116 worms.

But if 28,880 only lived, then to the square foot - - - - - - 92

According to correction of translators and copyists, if all lived, - - 214

And if 28,880 only lived, - - 158

Thus, the generally received statements of spaces, if explained to be in "square feet," would be as *ruinously small*, as they are *ridiculously large*, in "feet square," as worded.

As we presume that none of the copyists of Dandolo's translators, when brought to the question, will adhere to their spaces in "feet-square," they must at least abide by the same numbers in square-feet; which will serve only for the numbers of worms stated above. It is manifest that, if so crowded as either of the two last numbers require, all the worms would perish. We should fear to crowd even as the correction of Dandolo's spaces allows. But those greatly exceed the spaces received and repeated by the others. Mr. McLean thinks that 62 worms to the square foot, in their last age, are as many as should be suffered; and Mr. G. B. Smith advises still fewer. In the little treatise by the latter, which first appeared in vol. 6 of Farmers' Register, he stated, rather indefinitely indeed, that his hurdles "are from two and a half to three feet wide, and four to five feet long," and that "the size mentioned will accommodate 500 worms, when ready to spin cocoons;" and in his last number of the 'Journal of the Silk Society,' (issued since this piece was written) he states, precisely, that 1000 worms in their last age require 18 square feet, which is 55 or 56 to the square foot.

These writers are practical feeders, and neither of them would have copied the estimate allowing 214 nor even 158 worms to the square foot, because they so found it in the mistranslation of Dandolo. A more fatal error could not be inculcated than this one, which has passed, without correction or consideration, from the first American treatise, the Congress 'Manual,' to the latest, which Clarke sent forth in the last year, and which is the most voluminous, the most pretending, the most ambitious and pedantic, and, for its pretensions, decidedly the most empty of all. The author quotes Latin, Greek and French, and it is a pity that his learning did not extend to Italian; for then, instead of copying the errors of Dandolo's translator, he might have corrected the errors by reading and quoting the original.

Morin's French "Manuel," from which was translated the "Directions for feeding Silk-worms" published in the 6th volume of Farmers' Register, (commencing page 464,) like most other treatises, is but Dandolo's in another form. This we did not know when we made that translation, having then never met with the translation of Dandolo. Still, though having the same form of words to follow, and to be misled by, in our translation, the several measures of space first were rendered as "square feet," and not as "feet square." This was as near the truth as a mere translator could approach—inasmuch as the author translated has the general erroneously stated denomination of feet and inches as well as of numbers.

By the way, we were not aware, until after this article had been written, that another American translation of Morin's Manuel had been made, and that too earlier than our own. It was published in Boston in 1836. We have only examined it so far as to see that this also falls into the

length, of "about" 22 inches, agree very closely with the translators' "7 feet four inches," linear measure, though not when squared. But for this authority for, and mode of estimating the value of the braccio, it would be a difficult matter to fix it; as the braccio is of different length at Milan, Florence, Mantua, Reggio and Rimini, and every one of them is different from Murray's statement. See art. "Measures," in Rees' Cyclopœdia.

* The amounts stated in this column are as at page 203 of the English translation. Elsewhere, they are given with slight differences, and so there are these and sometimes other slight differences in American treatises, but nothing that is material, or that shows any suspicion of the general and great error.

usual and greater error of "feet square." Thus, in like manner as elsewhere, at page 77, it says that for the brood from 5 oz. of eggs, in the 4th age, "the space which the worms must occupy is 412 feet square"—which is more than 4 acres space of shelves, when the worms are not half grown, or will require twice as much space when fully grown.

In D'Homergue's recent volume on silk-culture, we expected to find that he, at least, as a foreigner, from a silk region, and professing to be entirely acquainted with the subject, would discover and expose the errors of Dandolo's earlier translators and their copyists. But his treatise is, like several others, almost a copy of the translators; and this gross error of space was not even suspected by him. It is true that in most places he directs "square feet" instead of "feet square." But in that he has merely fallen into one error instead of the other. Moreover, in one place, he takes the opposite and greater error, and gives his directions so explicitly and fully, that the error cannot be ascribed to inadvertence. At page 69, he says, "Fourteen feet eight inches square of table or wicker hurdles are needed for the accommodation of the worms from one ounce of eggs, until the accomplishment of the second moulting." And by his elsewhere, as to the after ages, stating "square-feet" instead of "feet square," it only shows that he went not only into one, but into both of these great and opposite mistakes, and without suspecting the existence of either of them.

WORKING COWS.

From the Maine Farmer.

Some people are strong advocates for working cows in the same manner that we do oxen. We have once or twice expressed ourselves opposed to this, inasmuch as we think that the cow has enough to do to attend to the dairy, and to impose the burdens of the yoke upon her, too, is requiring a double duty.

We are however willing that facts should be known. We have no doubt that the cow is very kind and patient in the yoke, for we have seen them in that situation, and know that they did well. In conversation with Mr. Francis Wingate, of Hallowell, the other day, upon this subject he gave us the following narrative.

A Mr. Hoyt, of Amesbury, Mass., many years ago, was in the constant habit of working his cows. He was a small farmer, having about twenty-five acres of land, which, with the aid of his two cows, he cultivated well, and obtained a good living for himself and family. His mode of operation was as follows—He usually obtained the help of a stronger team for breaking up and other heavy operations, but the ordinary work he did with his cows. He worked them about three hours early in the morning, and then let them lie by until three o'clock in the afternoon, when he worked them three hours more. When at work he kept them more generously than common, and he invariably milked them *three* times per day. It was a common remark that they afforded more butter and cheese than any other two cows in the town. If it should prove true that cows in general may be worked, say six hours during a summer's day, and by the help of a little extra keep, afford as much or more milk and butter than if not worked and ordinarily kept, there certainly is a saving to work them.

We are not so very strongly opposed to the system as to be blind to facts, and if experiment, fairly tried, shall prove it to be both economical and profitable, we should recommend it.

A good stanch yoke of oxen suits our ideas of a team better than any thing else, but there are many who are not able to own such a team, and the time spent in running round to hire often makes quite a tax to those who are under the necessity of doing it. If such persons can get up a cow team, and not abridge their supply of cream, it may prove a convenience to them. It is worth a careful trial.

HAY TEA FOR SWINE.

From the New England Farmer.

To Elias Phinney, Esq.:—I should not thus publicly have called upon you for any information which your long experience in swine breeding might suggest, but for the fact that your liberality is no less proverbial than is your opinion in these matters worthy of credit.

Within the last two or three years, I have bred and raised a considerable number of hogs, but, until within the last few months, I have been among the unbelievers touching "*improved breeds*" so called, and which are now circulating so much more generally than heretofore in our country. In September last, my attention was arrested by the pictorial representation of a Berkshire hog, at the head and advertisement in one of our agricultural publications—the *picture* of which pleased me so much that I determined forthwith to try them. I purchased at your establishment two sows of your favorite and well known Berkshire and Mackay cross—I obtained a pair of Chinese sows out of imported stock—my Berkshires were from the stock of Caleb N. Bement and others—and in the early part of November last, my establishment consisted in part of fifteen breeding sows of the Berkshire, Chinese, Berkshire and Mackay, and other crosses, together with two Berkshire boars, and one large Mackay, Berkshire and Mocha boar. As occasion presented, I tried various experiments with these animals, and, in most cases, was pleased with the results.

Towards the latter part of December, 1839, a work entitled the "*American Swine Breeder*" was published. Amongst the variety of articles recommended therein as food for swine, I noticed that a "Mr. Saunders, of Stroud, Gloucestershire, Eng., had made use of *hay tea* with much success." This gentleman "fed a stock of four hundred head of hogs, and in the course of his experiments used some 1500 hogsheads of the wash—maintained them at the very low rate of one penny per day—many of them were fit for the butcher," &c. &c. Economy in the *food* for swine being among the first considerations with me, I forthwith adopted

the use of *hay tea.* The *kinds* of hay recommended were, "clover, sanfoin, and meadow hay." I purchased a small quantity of each, and commenced the experiment. In the outset I used clover *alone.* I then used herdsgrass, but did *not* use any of the meadow hay. Instead of using clear water, (as I had been used to do,) I mixed the food with hay tea (made after the directions advised in the work above named,) and fed it out in all respects as I had done previously, indiscriminately to breeders, store hogs, shoats, pigs and all. The tea was made not simply by my direction, or under my supervision, but by my own hands.

"It deserves particular attention," says Mr. Saunders, "that in a week or fortnight after I commenced the experiment, the pigs improved in their coats, which, from looking coarse, assumed a gloss, and became fine and short, *a proof, surely,* of the great nutrition of the food, and of its perfectly agreeing with the hogs," &c.

It deserves particular attention, *(say I,)* that in a week or fortnight after I commenced the experiment, the pigs *did not* improve in their *coats*, or in any wise whatsoever—"*a proof, surely,*" at least, that "the great nutrition of the food" exhibited itself rather differently in the case of Mr. Saunders, than it did in mine, as the sequel will show.

From the first week after I commenced using hay tea—breeders, shoats, and pigs—*all* began to decline. My large sows were all with pig, and some of them considerably advanced in pregnancy. I took the usual precaution, and commenced physicking—still feeding them on food mixed with hay tea, however, (not suspecting evil *then,*) but, despite of all my care, two of my Berkshires "popped off." Upon opening them, I found the lower intestines completely clogged, the lungs spotted and inflamed, and upon the liver appeared small biles or pustules. Still I did not charge it to the hay tea, and still I fed them as before. My Chinese sow, *Blue Belle*, suddenly looked languid, and, for a meal or two, refused to eat. I changed her food and mixed a dish of meal, well warmed, with a portion of salts and sulphur, which I placed before her. She would not eat. She was in the sixteenth week of her pregnancy, and being very heavy, I did not attempt *forcing* any thing down her throat, lest I should kill her young, and thereby, probably, lose the mother. I accordingly left her to herself, in a dry, warm pen, for the night, and in the morning found *her* dead. I opened her, and found her lungs and liver affected, as was the case with the others, but *particularly* like those mentioned before, with regard to the *intestines*—the latter being, as it were, *tied up into knots*—so badly clogged as they were. Here was also a loss of *twelve pigs*, out of as fine a Berkshire boar as can be found in the state. Still, I did not attribute it to *hay tea.*

Heretofore, my hogs had been fed upon squashes, potatoes, and my refuse cabbages, beets, carrots, &c., together with an occasional mixture of ruta baga and house offal, all of which was thoroughly boiled and mixed before being fed to them. These kinds of food having become exhausted, I commenced more lately with ruta baga and sugar beets, (an equal quantity of each,) boiled together, mashed and mixed up with the hay tea—prepared as before. A pair of fine sows, of the Berkshire and Mocha breed, showed symptoms which led me to fear that they were to be the next victims.—I physicked them thoroughly, but to no purpose; one died, the other I killed, *to save its life*—or rather its pork. The choice Mackay sow I purchased at your establishment last fall, next refused her food. She was exceedingly fat, and I gave her the knife in season to prevent her dying of her own accord. I will here remark that *all of these* were affected precisely like those which died first, except that in these last cases, the *livers* appeared very much worse than did those of the first, being in two cases *completely covered* with these hard, viscous looking biles, which must necessarily have destroyed them in a day or too longer, had they been left to themselves.

A young boar, out of a fine grass sow in my possession last summer, promised well, and I purposed raising him, for his stock. At three months and a half old he shared the same fate with the rest, from the same cause, if I could judge from the symptoms exhibited during his sickness. It appeared that, uniformly, the pigs died within forty-eight hours after the first signs of indisposition. In this last case I had the boar placed alone, in a new floored pen, where I could watch the effect of medicine upon him. He would not swallow voluntarily, and I prepared a dose of castor oil and sulphur, which I forced down his throat at night. In the morning I could find no proof that the physic had operated, and accordingly I had him tied up and poured about a gill of lamp oil down his throat. After waiting eight hours and finding it produced no effect, but that he still declined and had become rather stupid, I bled him in the feet, which for a while revived him. Towards evening, as a last resort, I attempted the use of *mercury.* Having obtained four pills of ordinary size, I mashed them and tried to force them into his stomach; it was *no go*, however. We tied him up again, but he appeared in great pain, and died before we could get the last dose into his mouth. Upon examination, I found his intestines knotted as in the previous cases, and not a particle of the medicine administered the day previous, had passed these knots.

"*Blind Nancy,*" my oldest and best breeding sow, (originally from your establishment,) of the Berkshire, Mackay and Mocha breed, gave me eleven pigs on the 22d of December last, ten of which I found *dead* in her pen. Whether they were born alive or not, I am unable to say, but I am inclined to think they were not, as the last one lived only about an hour after its birth. Nine of these pigs had been purchased by different gentlemen in my neighborhood, at $10 each, "to arrive." This animal being a very superior one, I felt anxious to save, and of course spared no care or attention necessary to effect it. I had the satisfaction to find that she experienced very little apparent inconvenience from the loss of her fine brood, but, on the contrary, did well after her *accouchement*, upon a slight allowance of *dry* food. In ten days afterward, I commenced feeding her as before, upon vegetables mixed with hay tea. On the 11th of the present month, she left her food in the trough, for the first time since I owned her, (being naturally a very hearty feeder,) and began to act suspiciously. I tried physic again, but to no effect, and fearing to run the risk, after loosing so many, I placed her most reluctantly in the hands of the butcher. Her lungs were uncommonly *purple*, and her lower intestines were in the same condition as we had found the others.

My Chinese sow "*Plentiful*"—a fine breeder, from stock originally imported into Salem—on the 15th of this month, dropped twelve pigs (out of my Berkshire boar) every one of which *came* dead! and from present appearances, I fear the mother will soon follow.

Thus you see, sir, I have met with several severe losses, and I cannot conceive but *the cause* of all these misfortunes is the same. The object, therefore, of this communication is *not* to assert that hay tea has killed my hogs, (although I have abandoned the use of it, at least, for the present,) but simply to state facts, and inquire of you, whose opinion in regard to this subject will be authority, whether or not it is probable that the astringent powers of the article herein named (hay tea) are such as would produce these disastrous results, and, if not, what the cause can be, judging, as we only can, from the symptoms produced previously to, and the condition we find the body in after death.

Your opinion will greatly oblige one at least, and I doubt not that it will be thankfully received by all the readers of the Farmer.

I have the honor to be,

Your ob't servant,

GEORGE P. BURNHAM.

Roxbury, Mass., Jan. 20, 1840.

BEST FORM OF A COCOONERY.

From the Journal of the American Silk Society.

We are frequently called upon for our opinion of the best form of a cocoonery. After much reflection, and consultation with men of experience on the subject, we have arrived at the conclusion that the best form, under all circumstances, is that of a rope-walk; that is, long and narrow, wide enough for two rows of shelves one story high, and as long as may be required to accommodate the number of worms required. In this form, in places where lumber is plenty, it can be constructed very cheaply. The roof and weather boarding can be supplied with slabs, and the frame may be made of very light timber; and the whole work could be done by a very rough carpenter. The shelves should be about three feet wide, with a four feet passage between them, and a three feet passage between them and the walls. Cross-passages three feet wide should also be provided, at distances that might be indicated by the length of the plank out of which the shelves are formed: thus, if the plank be fifteen feet long, then the cross passages would occur every fifteen feet, or in other words the shelves should be fifteen feet long, and an interval of three feet between each range of shelves. The shelves should also be convenient as to height; they ought not to be higher than can be conveniently reached and attended to by the attendants; and hence, five shelves one foot apart will probably be the most convenient number as to height. A cocoonery upon this plan will accommodate 12,500 worms to each range of fifteen feet shelves; or every eighteen feet of the cocoonery will accommodate 25,000 worms; and seventy-two feet long will accommodate 100,000 worms. We will remark here, that our allowance of space for the worms is very liberal; but as it is of great advantage to the worms to be allowed plenty of space, it is deemed best to allow them, as above indicated, nearly a square foot to 50 worms. There are many conveniences and advantages attending this plan. The shelves are more convenient of access; the light from either side operates equally on all the shelves; while on the old plan, the outside shelves receive too much light, and the centre ones too little. In case of contagious disease attacking any portion of the worms, they can be more readily separated from the others, and the air in the room is not so liable to become foul. The cocoonery can be built in the midst of the mulberry trees, and the leaves can be carried into it through the doors in any part of its whole length. Windows should be made at every nine feet, so that each range of shelves shall have two opposite to it; and doors should be opened at convenient distances in the sides, and one at each end opposite the middle passage. The windows and doors should be made to close tightly, that the light may be partially, and the cold and damp air entirely excluded, when necessary. If stoves or fire-places be provided, to guard against cold and damp air, it will be a great advantage in bad weather, and the careful attendant will realize the more profit from his labors. But in the middle and southern states fire will seldom be necessary, especially after the first crop of the season.

Many persons have too many shelves in the range, thus making it difficult to feed on or clean the upper ones. The attendants must either carry stepping-stools with them, or place their feet on the lower shelf to enable them to reach the upper shelves, thus often crushing worms, injuring the shelves, and at last attending the upper shelves very imperfectly. It would be better economy, we think, to erect the range of shelves only as high as above indicated. The site of the cocoonery should be high, as it of course will be if the trees are growing on *their* proper situation.

The costly buildings and fixtures so often described, that have been erected, and recommended as patterns, are, in our view, worthy of any thing but imitation. All that is required by silk worms, are proper food, shelter, and protection from the inclemency of the weather and the sun, and from vermin; no matter how simple or cheap the building may be, if it accomplish this, it is all that is required.

G. B. S.

GREAT WALL OF CHINA.

From the New England Farmer.

Even when united under one emperor, China trembled at the Tartars of the desert. About two centuries before the birth of Christ, She-hwang-te (the brook-burner,) constructed the great wall of China, to prevent their incursions. The wall, which has always been considered one of the world's wonders, is 1500 miles in length, of great height and thickness, furnished with fortresses and towers innumerable, and is carried with singular skill over mountains and rivers, as well as across the plains and valleys. Lord Macartney exclaimed on seeing it that it was certainly the most stupendous work of human hands, and he rationally concluded that at the remote period of its building, China must have been a very powerful and civilized empire. Dr. Johnson was accustomed to say of it, that it would be an honor to any man to

say that his grandfather had seen the great wall of China. Mr. Barrow, who saw it with Macartney, went into some amusing calculations as to the quantity of the materials it contains. According to his account, all the materials of all the dwelling houses of England and Scotland, supposing them at that period (at the end of the last century) to amount to 1,800,000, and to average 2,000 cubic feet of brick work or masonry, would be barely equivalent to the bulk of the wall, without taking in its fortresses or towers, which he calculated contained as much masonry and brick work as London did at that time. Stupendous as was the work, it failed in its object.

ON MAKING GOOD BACON.

From the Agriculturist.

The beginning of a year is generally the time for putting up pork for bacon; as this is a standing dish in the west, I have concluded to give you the result of thirty years' experience upon this important subject. The first thing necessary to make good bacon is to have fat hogs—slaughter them in the beginning of the week, so that you can take care of the offal before Saturday night; otherwise, if a warm day or two should intervene, part of it may be lost. It is highly important that hogs slaughtered for bacon, should be well bled—the more completely the vessels are emptied of blood, the less disposition there is in meat to taint or putrefy. As soon as the hog is well cleaned and hung up, it should be freely washed with *warm water*, wiped with a towel and carefully scraped with a sharp knife, especially the head, ears and feet, if you wish to have good souse or hogs-head-cheese. These parts are generally neglected, and thrown by "for a more convenient season," and then taken up by the cook or some idle chap about the establishment, and the hair singed off, and the shin burned until it becomes black and bitter, thereby imparting its color and taste to the souse and hogs-head-cheese. After gutting the hog, the inside should be carefully and freely washed with *cold water*, with the mouth open, so that the whole may pass through the throat, and remain in this condition until completely cool, which will generally take place, even in moderate weather, in one night. If the weather should be so mild that it will not cool in one night, it had better be cut up, and spread upon brick and stone pavements, previously wet with cold water; if the meat is still soft, dash cold water upon it, and it will soon be ready for the salt, but in all cases it should be perfectly cool if practicable. In one or two instances I have made as good bacon as I have ever made, out of meat frozen so hard that it had to be cut up entirely with an axe. As to the mode of salting and the quantity of salt necessary to cure pork, so as to make good bacon, every man thinks he knows better than his neighbor. I have experimented for the purpose of ascertaining the best mode of salting down pork, as also the proper quantity of salt and other ingredients, such as sugar, molasses, red pepper and saltpetre, all of which have their advocates, and have settled down and pursued the following practice for the last twenty years. I measure a bushel of salt—spread it upon a table—weigh a pound of saltpetre, pulverize it carefully and mix it thoroughly with the salt. This mixture is sufficient for a thousand weight of small meat or eight hundred of large, to be well rubbed upon every piece, and more especially upon the fleshy surface, taking care to pack your joints at the bottom and fill up the little interstices, with jowls, chine and rounds—the latter piece is made by cutting the neck off at the shoulder and jowl. The length of time necessary to keep pork in salt to make bacon depends upon the weather and the size of the meat. If the weather is mild and the meat small, four weeks will be long enough; but if the weather is cold and the meat large, it should remain in salt from six to eight weeks, and should be taken up at the end of four weeks and well rubbed and sprinkled with salt, in case the first has dissolved. It is then to be hung up in a dark smoke-house, and the darker the better, for the purpose of excluding flies—you will never find flies in a room where the light is completely shut out. The higher your smoke-house the better, so that you may hang your meat out of the influence of the heat—every joint and jowl should be hung by the thick end and every middling by the thick edge, or that part of the middling that was cut from the back bone; this I *know* to be a matter of the first consideration in making good bacon—by attending strictly to this rule, you will retain all the juices of the meat, as well as the salt that has been absorbed—or in other words, your meat will *not drip;* whereas, if you reverse the position and hang it by the small end, it will drip, become dry and hard and lose in weight, and what I conceive to be of more importance its fine flavor. Some who make good bacon, think that it is important to smoke your meat with some particular kind of wood, but I imagine the only secret about this matter, is the bitterness imparted to the meat, thereby rendering the taste unpleasant to the fly, and by keeping up a continual smoke, you create an atmosphere that the fly cannot live in—viewing the matter thus, we have every day or two thrown a few pods of red pepper upon the smokewood—this produces an atmosphere very unfit for the respiration of man, and I apprehend equally so for the fly. Our meat continues suspended in the smoke-house during the year, is lightly smoked every morning and plentifully smoked every damp day. If your readers will observe these rules, I will almost venture to insure such bacon as would make any epicure smack his chops. JOHN SHELBY.

BARN CELLARS.

From the Yankee Farmer.

Though the raising of roots to any amount of consequence, for stock, is of recent introduction in this country, yet enough has been done in this way to convince every observing farmer that it is a profitable business, and so evident are its advantages, that it will soon be attended to extensively. Most farmers who raise many roots find an inconvenience for want of a suitable place to store them, as but very few have barn cellars for this purpose; and when the house cellar is sufficiently large, there is great inconvenience in carrying the roots to the barn as they are fed out in winter. Besides this disadvantage, a large quantity of roots

in the cellar, especially in mild weather, will heat and produce unhealthy exhalations, to the prejudice of those who reside in the house.

The present is not a good season for constructing barn cellars, but it is the time to think about it, as many feel the want of this necessary convenience to the farm; and they should give their attention to the subject, examine how others construct them, when there is an opportunity, that they may be prepared to execute this work with discretion and despatch when they undertake it. Perhaps some of your correspondents can give us some directions on this subject that will be profitable. Some farmers object to raising roots on account of the labor of feeding in cold weather; if they will prepare to store them in the proper place, which they can do at a small expense, their objection would be obviated.

MAGNIFICENT CONSERVATORY.

From the Gardener's Magazine.

One of the most magnificent structures in England has been lately erected by the Duke of Devonshire at his beautiful residence at Chatsworth. It consists of a large tropical conservatory. In general design, it may be compared to a cathedral, with central aisle and side aisles. The entrances will be at the ends, through porches, which will be treated as green-houses. When the whole is completed, it will cover an acre and a quarter of ground. There will be a carriage way through it, which will form part of a general drive through the pleasure grounds. It will be heated by six fires, all of which, and the means of access to them, the places for fuel, &c., will be under ground, and the chimneys carried in a tunnel, up the side of a hill, to the distance of nearly a furlong, so that there will not be the slightest appearance of artificial heating, or smoke, or sheds, &c., either within the house, or exterior to it. The conservatory is situated in an open part of a lofty wood, in nearly the centre of the pleasure-grounds, and is unquestionably the largest structure of the kind in existence, or on record. The whole is under the direction of Mr. Paxton, by whom it was designed. It was, probably, nearly or quite finished the past fall.

INJURY TO CORN FROM STRIPPING THE LEAVES FOR FODDER. REMARKABLE FERTILITY, AND CHEMICAL COMPOSITION OF SCIOTO BOTTOM LAND.

To the Editor of the Farmers' Register.

Nelson, Dec. 16th, 1839.

I have this year made an experiment to ascertain the loss occasioned to the corn crop by taking off the tops and blades at the usual time. Eight rows at the gathering the fodder (September) were left untouched, extending from one end to the other of a field of fifty acres. Four rows on each side of the eight extending in the same manner through the field, and on ground in every respect the same, had the blades pulled and the tops cut. The corn when matured was carefully gathered, put in separate parcels, stripped of the shuck and measured. The corn which retained its blades and tops to the last furnished 17¾ barrels of measured ears; the other eight rows which had been stripped yielded 16 barrels. A bushel of each was weighed, but there was no apparent difference by steelyard. The loss sustained by taking away the blades and tops is by this experiment within a small fraction of 12 per cent., being 11 barrels and $\frac{15}{16}$. This however is not all; the land is deprived of an exceeding rich manure in the blades and tops, as will occur at once to those who have observed the places where blade and top stacks have stood; a manure that goes far towards affording an equivalent for the draft made from the land by the crop. I have a field, on the Scioto in Ohio, from which forty successive crops of corn have been taken, nothing but the grain however having ever been removed. The ground has sustained but little diminution in its product, except where the soil has been abraded by freshets on a few spots. This culture has been forced by peculiar circumstances of position in relation to the river, and the kind of labor used there, but is about now to be changed, as those difficulties are overcome. I am sure no land could have borne such a system where the tops and blades were taken off; but the limits of a letter would not afford space for my reasons.

I left at your office in Petersburg, last June, a specimen of soil from the field here mentioned, and a specimen from some ground yet covered with wood immediately adjoining, also a third specimen from land that had yielded crops for the last ten or twelve years, from the vicinity, and of the same formation. An examination of these specimens, by one (like yourself) skilled in the analysis of soils, might lead to interesting results.

Yours, with high respect and regard,

T. Massie.

The specimens of soils from the Scioto bottom land referred to above were marked by Dr. Massie as follows:

"No. 1. Virgin soil, still covered with forest.
No. 2. Soil a few years cleared and cultivated.
No. 3. Soil from a prairie that has borne forty consecutive crops of corn. The land lies near the confluence of the Scioto with Paint Creek, and has many evidences of having been formerly the bottom of a lake."

Upon being carefully examined for *carbonate of lime*, No. 1. contained none; and No. 2. barely a trace, if indeed any at all. Our correspondent will merely in this see confirmation of our doctrine of "*neutral soils*," and not infer that these soils are destitute of lime in some other form, though containing none in that of *carbonate*.

No. 3, (the prairie soil, of such enduring fertility,) from 500 grains, tried in Davy's pneumatic apparatus, yielded 24 oz. measures of carbonic acid gas, indicating the presence of 48 grains of carbonate of lime, or very nearly 10 per cent. But there was evidence that a large proportion of this carbonated earth was *not lime*, but *magnesia*; though we had not the means to determine the proportions of each of these earths. This is a

remarkable fact, and an additional confirmation of our opinion formerly expressed, that the carbonate of magnesia, as an ingredient of soil, is a powerful cause of fertility, instead of barrenness, as supposed by some European writers. We formerly found (by accurate examination and sure tests) magnesia as well as lime in the fertile alluvial soil of Red river; and we have lately seen it stated that magnesia is also an ingredient of the alluvial borders of the Nile.

Our highly respected correspondent overrates our skill and knowledge in analyzing soils, and still more our facilities. It was on account of being unprepared for such work, that the delay and apparent neglect in this case have occurred.

ED. FAR. REG.

For the Farmers' Register.

REMARKS ON MR. CARTER'S PROPOSED CHANGE OF ROTATION. INSECTS AND WEEDS.

January 17th, 1840.

Looking over the Dec. number of the Register, my attention was attracted to the signature of "Hill Carter," and as every thing from the pen of that eminent agriculturist is of peculiar value, I perused his piece with unusual interest. Mr. Carter's thoughts have been drawn, (and I am rejoiced to see it) to a subject as mysterious and unexplored as it is of the highest importance. In all time the depredations of insects have been the most serious drawbacks on the profits of agriculture, and their increase within the last three years in Eastern Virginia has justly produced the most alarming apprehensions. *I* am superstitious enough to view it in the light of a Divine dispensation, and as such cannot, without supernatural aid, be controlled by the power of man; we should however do all that we can, and leave the issue to *Him* whose chastening hand will be withheld only when the attribute of justice gives way to that of mercy. Both as a Christian and as a farmer, I am truly gratified to see such subjects introduced for examination; and a free discussion of them may lead to meditation on the causes of Divine visitations, and thus may benefit our moral, if it does not our agricultural, condition. Mr. Carter's idea (as I understand it) is, that encouragement is given to the depredations and increase of insects, by yielding to the land a portion of its own productions, and that, "*e converso*," they can be checked by depriving the soil of its vegetable cover; and close and severe grazing is pointed to as the remedy for the evil. To accomplish this end he proposes the adoption of a five-field rotation, viz., one year of rest, one year of close grazing, and three years of grain crops in succession. We will now see if the end will be answered by the means proposed, and secondly, what will be the effects on the land from this system of culture. Of all the insects whose ravages are most fatal to the hopes of the farmer, the chinch bug and Hessian fly stand pre-eminent; indeed all others are comparatively innoxious. To those who have attended to the habitudes of these insects, it is well known, that neither of them ever assail the great ameliorator in our system of husbandry, the clover crop; in it they neither find food or shelter. To deprive the land therefore of this, its only recuperative crop, when it is required to bear three exhausting crops in succession, would be to induce sterility, without giving a check to the evil complained of; for it is a well known fact, that all insects find a greater supply of food, and consequently remain longer and multiply faster on weak and delicate plants, the product of exhausted fields, than on those of a more vigorous and rapid growth. If close grazing was the remedy to control their ravages or check their increase, as Mr. Carter imagines, then would actual experiment have long since tested the fact. Eastern Virginia is divided into two systems of agriculture, antipodes to each other; one, the inclosing or non-grazing, the other, the old three-field or close grazing system. Now I appeal to all observation to say, whether the latter has ever been, or is at this time, more exempt from insect enemies than the former; and I leave the answer to those who have noticed the results of the clover worm, so called. I have never, before the instance adduced by Mr. Carter, heard of their doing injury to the wheat crop, especially at the fall season of the year. I had thought their depredations were confined to spring crops, and in warm weather. In the spring of 1818 (I think it was) their inroads were more general and more fatal than at any subsequent period; and I well remember that complaints were then louder from those farmers whose crops were grown on thin highlands, than from those on low grounds; and the cause was easily enough explained, the crops growing on lands impoverished by severe grazing and hard cropping were more dilatory, and, paralyzed by a backward season, were longer exposed to the attacks of the insect than those produced on a more genial soil, highly stimulated by vegetable matter turned in for their preparation. The last soon got beyond the reach of the insect, while the first were slowly growing and staggering under the attacks of their foes. With these facts before me, I cannot acquiesce in the soundness of a theory, from which certain and inevitable evils must flow, while the anticipated good is, to say the least of it, uncertain and doubtful.

I will now examine into the effects on the soil of a five-field rotation in connexion with close grazing, and I think it abundantly susceptible of proof, that its results will be found highly disastrous. The first objection to the proposed system is, in my opinion, insuperable, and needs no other charge against it to ensure its entire rejection, viz., it demands three exhausting grain crops in succession; and when is superadded thereto, a close and severe grazing the year preceding the introduction of this scourge, there can, I imagine, be no difference of opinion as to its total condemnation. Under this system of heavy exaction with inadequate returns nothing can save the doomed fields from utter prostration. No depth of soil, no vegetable or mineral manures, and no agricultural skill, can ward off their inevitable destiny; the redeeming year of rest could no more save it than could a moment's respite from torture shield from death the unhappy sufferer stretched on the fatal rack. The lapse of five years between the drilled and horse-hoed crops is another material objection to the contem-

plated rotation, inasmuch as every encouragement would be thereby given to the production and perpetuation of vegetable pests—an evil, I will venture to say, as deleterious to the land, and as fatal to the hopes of the cultivator, as its kindred curse of the animal kingdom. Bad as they are, I would rather have to contend with chinch bug, Hessian fly, and clover worm, than with wild onion, blue grass, Canada thistle, "*et id omne genus*," of annual and perennial pests. I might hope in the efficacy of a severe winter, or some other natural cause, to relieve me from the one, and I know, by sad experience, that years of toil will not free my poisoned fields from the other. To use a common expression, I know a thing or two on this subject, having once tried, and am now reaping the bitter fruits of a six-field rotation. From the 1st of March to the 10th of April a great portion of my farm labor is employed in what is technically called "cockling wheat," *i. e.* abstracting wagon loads of wild onions from the crop; and after all, if I escape, at the time of delivery, a receipt from the miller for——bushels of onions mixed with wheat, I consider myself extremely fortunate. This fact will be endorsed, I am sure, by a near neighbor, who has a similar calamity entailed on him by upwards of 20 years' perseverance in a five-field rotation, which, fortunately for his splendid estate, has been at length abandoned. If the clover crop in the proposed rotation could at all times be relied on, then the year of rest would be indeed a year of jubilee to the persecuted fields, but that crop has become as precarious and uncertain as any other, and, whenever it fails, the noxious and more hardy plants that spring up in its place have a fair field for propagation; and as they are rejected by all animals as food, they will have two years in five of undisturbed possession, to strengthen and perpetuate themselves. Without going farther into this subject, or adducing additional reasons to substantiate my dissent to the proposed plan, I cannot but express my fear that when the theory is reduced to practice, it will be found unavailing to arrest the depredations or check the increase of insects, while it will entail evils not less disastrous and far more difficult to conquer. The great master of the human heart has taught us that "it is better to bear the ills we have, than fly to others that we know not of." The advice is not the less wise and true for its being poetical. I know not how it may be in the section of country below tide-water; but with us, above it, a cleansing crop once in three or four years is indispensable in any system of neat and profitable farming; and so well satisfied are our best farmers of this fact, that the three-field rotation is getting into general use. I do not mean the old Virginia land-killing course, of corn, wheat, pasture, but the more modern routine of clover, corn, wheat, aided by a liberal use of putrescent manures, permanent meadows and standing pastures of artificial grasses.

This subject is most attractive, and strongly tempts in its support an excursion into the field of discussion; but having occupied my full share of your columns, I will leave it to a better farmer to detail its advantages. Mr. Randolph Harrison of Elk Hill, Goochland, has fully tested the rotation, and his fine estate bears ample testimony of its efficacy: I therefore hope he will be induced, through the Register, to delineate its advantages, by detailing his practice and its effects on his land.

R.

NOTES ON EUROPEAN AGRICULTURE. BY A CHARLESTONIAN.

No. I.

From the Southern Cabinet.

The American traveller who visits Europe for the first time is introduced so suddenly upon such a variety of objects, equally new and interesting to him, that he finds it difficult to confine himself to any department of science or knowledge. Scarcely has he shaken off the tedium of a long sea voyage, and recovered the use of his legs, and the steadiness of his head, when his mind is distracted by a multiplicity of objects, all inviting his attention, and each claiming the precedency. He now visits for the first time scenes of which he read in his youth, and which, from their antiquity and early recollections, have become classic grounds. He traverses the fields of tournaments and battles—he climbs Ben-Lomond and the Alps—he ascends the Rhine and the Danube—he sails over the smooth waters of the lakes of Scotland and Switzerland—he visits the thronged cities of London and Paris, Berlin and Vienna, and finds a world of wonders in each—and who, Mr. Editor, has time or inclination to attend to the dull scenes of agriculture?

I confess that this was in part my own case. A very extensive tour, during the short summer of 1839, enabled me only to take a cursory view of the agriculture of Europe—other objects engaged the principal part of my attention. My notes were made hastily, and never corrected. Such however, as they are, I will give you. But I must be allowed to do it in my own rambling way, and in my own time. I need not say that the southern planter will find nothing in my notes that will throw any light on the cultivation of the staple articles of our southern country. Cotton and rice, although abundant in the warehouses and manufactories, and although feeding and clothing half Europe, are not cultivated there, and Indian corn (in consequence of the cool summers) I only saw growing at one place in Baden, and the stalks were not much larger than a pipe stem. Yet in the cultivation of other articles—in the rotation of crops—in the system of manuring, and other modes of restoring and improving exhausted lands, we have much to learn from the older countries of Europe, where a dense population has taught them the value of lands, and the necessity of calling in the aids of science and the arts in their cultivation.

As a general remark, I am disposed to believe that Europe in general, and England in particular, is more favorable to the cultivation of wheat, and other grains, which go under the denomination of corn, than the United States, with the exception perhaps of our western country; but that our own soil can by a proper system of tillage be rendered twice as productive as it is at present. The improvements in implements of husbandry can be more easily introduced among us than in Europe, where it is exceedingly difficult to induce the laborers to lay aside the old heavy ploughs and wooden-toothed harrows, which we have abandoned for half a century; and when I have seen the miserable hoes, spades and rakes, used by the peasants of France and Austria, I have sometimes wished that a revolution (not political, but agricultural) might sweep them and their wooden shoes

into oblivion together, to be remembered only as the relics of a clumsy, if not a barbarous age.

In fine breeds of horses, horned cattle and sheep suited to the different climates and pastures—and in the careful manner in which these distinct varieties are kept separate, Great Britain takes the lead of the world. The black faced sheep of Scotland differs so widely from the varieties found in the downs and low countries of England, that they would scarcely be recognized as the same species. The same may be said of the black cattle driven from the highlands to the markets of Edinburgh and the northern counties of England, when compared with the various breeds found in the level rich counties of England. Each variety is confined to localities suited to its size and habits. The mountain cattle and sheep would not succeed well in the low countries, nor would the breeds of the downs thrive on the mountains. No traveller in England who knows a horse from a donkey, can fail to admire the distinct breeds of horses each in their nature admirably adapted to the services required of them. The carriage-horse, the hunter, the dray-horse, and the racer, can be distinguished at a single glance. The dray-horse in the streets of Liverpool and London, unwieldy as the elephant, with a foot of the size of a peck tub, could scarcely be conceived to be the same species as the little Shetland pony, that is seen carrying the groups of gay travellers to the top of Ben-Lomond, climbing over the rocks and up the mountains like so many squirrels. I witnessed at Ratisbon, in Bavaria, one of the finest collections of horses I ever beheld. They were owned by the prince of Taxus, whose expensive stables were more magnificent than many of the palaces of Europe,—fitted up with marble troughs—fountains for bathing—the name, country, and pedigree of each placed in gilt letters on the wall. The number of grooms, and careful attendance, and other fooleries, reminded me of what I had read of the honors paid to the sacred bulls of India, or the white elephants of Ava. Among these were horses not only from Mecklenburg, Saxony and France, but from England and Arabia; and to me the English courser appeared not only the most elegant in form, but was admitted by better judges than myself, more active and fleet than those of Arabia itself.

In the preservation of seeds of grain and vegetables, infinitely more pains are taken to preserve the varieties distinct and unadulterated than with us. In the mountains of Scotland, there are certain districts appropriated solely to the cultivation of garden seeds—and no two varieties, that are in danger of becoming adulterated by being placed near each other, are allowed to be cultivated in the same district. I noticed, at Edinburgh, in the collection of Lawson & Son, seedsmen and nurserymen to the Highland and Agricultural Society of Scotland—83 varieties of wheat, 62 of peas, 51 of turnips, 146 of potatoes, and an immense number of species and varieties of grass seeds, some of which may probably be adapted to our southern country. In a subsequent number, I will endeavor to recur to this latter subject, and point out those species on which it would be advisable to make experiments.

The benefits of societies for the promotion of agriculture, in stimulating industry and ambition, I saw exemplified in Scotland, England, and at the fairs of Germany. The Highland Society of Scotland has existed sixty-one years, and from one of the bleakest and most sterile countries of Europe, Scotland has, with all its disadvantages, risen to a state of agricultural prosperity, far beyond any thing which could have been expected from a soil and climate; and some of the counties, especially the Lothians are not inferior, in point of cultivation and product, to the richest in England. At a meeting of that society, held a few weeks previous to my arrival, 177 members were added at one time, paying three guineas entrance, and one guinea annually, and these included the names of the most respectable men in the country. At this meeting, there was an additional sum of £1,500 ($7,000) subscribed, to promote the interests of the society. Every agricultural county makes an annual report, and thus thirty-three reports, embracing every object of agricultural interest, are annually submitted to the society.*

English agricultural societies, although with less uniformity, are sedulously engaged in the same cause, and the result has been the general diffusion of agricultural knowledge. The different soils have been analyzed—the kinds of manures and modes of cultivation adapted to each have been pointed out. The steam engine has been introduced in thrashing and for other agricultural purposes, and Great Britain, (including Ireland and Scotland) which formerly averaged only nine bushels of wheat to the acre, last year produced in the aggregate, 19½

* This society was founded in 1784, by a few gentlemen, who "formed themselves into a whole and corner club, in a coffee house called the Exchange," in Edinburgh. From a most wretched state they have raised the agriculture of Scotland, until it has reached the very topmost rank. The means which were employed by this society, are thus detailed in the Edinburgh Quarterly Journal of Agriculture:

"In the days of its youth and feebleness, the Highland Society sent the leaven of the turnip husbandry into all the glens and straths of the north, by offers of small prizes to certain Highland parishes; and the same may be said as to the growth of clover and the finer grasses. As it advanced in strength (as to numbers and to cash,) attention was paid to premiums for stock; then came offers of reward to men of science to discover better implements and machines, to diminish friction and consequently draught, such as in the thrashing mill and other parts of agricultural machinery. Still advancing in the scale of intellect and of science premiums were offered for essays to bring to light the facts connected with chemistry and natural philosophy; and, under the auspices of the society was set up the 'Quarterly Journal of Agriculture,' a work which has been the vehicle of conveying so much useful information to the agriculturist, that we humbly venture to say it ought to appear on the table and book-shelf of every farmer's parlor. After this, the great stock shows were resolved upon, as another link of union between the society and the practical farmer, at the same time throwing aside all paltry feeling, and making them open to stock from both sides of the Tweed, [i. e. from England as well as Scotland.] How well they have succeeded, let the last one at Glasgow bear witness. (This was the most splendid show of fine cattle ever exhibited.) Nor has the society forgotten the beauty of the country, as the premiums offered in regard to planting trees and such like subjects fully testify; and to sum up all, it may be said, the Highland society has been a *point d'appui*, a rallying point, to which the agriculturists of Scotland might look, and a fostering mother to all who, although strong in talent, were weak in interest to make it public.

bushels; and three of the counties of Scotland, and several of England, averaged 51 bushels to the acre. A farmer by the name of Thomas Oliver, residing five or six miles from Edinburgh, leased a farm for the last twenty years, of 150 acres, paying annually a rent of 10 guineas per acre, ($7,500) on which he raised grain, hay and vegetables for the market of Edinburgh. This lease he has recently renewed for nineteen years, (the usual time to which leases run) on the same terms, and from a poor man he has become independent in his circumstances, and now rides in his carriage. What American farmer could make a profit that would enable him to pay such an enormous rent? All may be accounted for on the principles of judicious manuring and careful industrious cultivation. On the continent, especially in Germany, their annual fairs bring together the farmers and peasants of all the surrounding country, where their ambition and industry are stimulated by a variety of fetes, and the distribution of prizes to successful competitors; and whilst princes, dukes and barons are engaged in awarding prizes to those who have been most successful in the cultivation of grains and cattle, their lovely wives are occupied in a humbler, but much more lively scene, in complimenting and distributing premiums to the industrious housewife, for her fine specimens of fruit—her butter and cheese—her linen cloths, weaving, knitting, and other manufactures. I have no doubt I shall be ridiculed for my want of taste, when I state that, to me, the Grand Duchess of Baden, presenting a silver cup to a peasant girl, before an assembled crowd of farmers and nobility, for the finest specimen of manufactured gloves, was a more interesting sight than that of the gay Queen Victoria, racing through St. James' Park, with fifty fools at her heels, striving not to be distanced by their lovely mistress.

The industry and expense bestowed in collecting and applying manures in England, and which is only exceeded by the more scientific mode adopted in the environs of Paris, at the "Boyanterie de Montfaucon," where all the offal from the city, including every dead animal—(the horses of this description alone amounting annually to 16,000)—is converted into manure, may be noticed in a future number, and is a subject which is not only of great importance to the farmer, but should be carefully investigated by the authorities of all large cities.

From a cursory review of the cultivation of the various kingdoms of Europe, it appeared to me that England was in the highest state of cultivation, and which, from its beautiful thorn hedges—its neat cottages, adorned by the eglantine, honeysuckle and ivy, chequered here and there by the park and lordly palace, rendered the whole land a picturesque garden. Some of the counties of Scotland, such as the Lothians and the carse of Sterling and Gowrie, are in no wise inferior. The little I saw of the cultivation of Ireland, rather exceeded my expectations. Belgium and portions of the Net erlands, have a better soil than that of England, and are fully as productive, but they want neatness of cultivation, and, like the whole continent of Europe, are destitute of fences and hedges—to me the fields wanted ornament, and the cottages seemed without much comfort. The fields of Denmark were loaded with an abundant crop of wheat, but there, as well as every where else, I heard bitter complaints of hard times, and the severe exactions of government. I frequently thought that it would be no bad plan for our American grumblers about taxes and oppression, to take a trip to Europe, and learn a wholesome lesson. Take my word for it—it will stop the mouths of demagogues, reconcile them to their own country, and they would return—not as politicians, but Americans, saying, I have sinned against heaven and my native land, and am now only worthy to be called thy son. I found the Grand Duchy of Baden and parts of Wirtemburg, better cultivated than Prussia in general, probably because the soil was more susceptible of improvement. Switzerland is too romantic to be rich—and the Rhine is too classic a stream to be the dull river of commerce, or be surrounded by any thing else than mountains, where the vine clambers along its sides and the ruined castle frowns on its loftiest peaks. In the cultivation of France, I was greatly disappointed—the sword has scarcely had time to be beat into the ploughshare—the soldier finds it hard to stoop to the labor of the harrow and the hoe, and seems disposed, yet a while, to leave this drudgery to the women. Austria, with its fine soil and climate, is retarded in agricultural improvement by the wealth of its nobles and the oppression of its peasantry. Its possessions in Bohemia appeared rather better cultivated than those portions bordering on Hungary and Venice.

Of fruits, I found the apples in England leathery and inferior—on the continent, the flavor was finer—but I give a decided preference to those of my own country. Peaches were every where wanting in flavor. The best I tasted were from a green house near London. The only ones I found growing in the open air that I regarded as in any way comparable to those of America, were at Schaffhausen, at the falls of the Rhine. But whilst the Northern part of Europe does not appear to be well adapted to impart a delicious flavor to the apple and the peach—it greatly excels in other fruits. I find myself growing envious when I think of their fine gooseberries and cherries—the pears and plums of France and Germany are most delicious, and when my notes inform me that I bought the latter, of the size of a fowl's egg, twenty-five for a penny, I feel that I ne'er shall see the like and so cheap again. Were I a cultivator of fruits in Carolina, I would import the few varieties of apple that succeed in our middle and back country, and the peach that succeeds every where, if not attacked by the curculio, from Pennsylvania or New Jersey—the gooseberry and currant, which succeeds among our mountains, from Long Island—the cherry from some of our northern states—the grape from some of the best varieties cultivated in our upper country—and the pear, plum and prune from Bordeaux; those brought from the latter place, are particularly adapted to the climate of Charleston, and I have seen them cultivated here with great success.

PEACH TREES.

From the Agriculturist.

Lest some one may suffer from ignorance as I have done, I give my woful experience to the public; for it sometimes does as much good to

guard the farmer against error, as to inform him of an improvement in his husbandry.

For three successive years I gathered about ½ a bushel each year of choice peach stones. I laid them by *in a safe place* as I collected them, and about the first of October planted them in rows where I wished to form a nursery. In the two first trials, not a single one sprouted and came up. About one out of fifty germinated in the third trial. I was much at a loss to account for three fatal failures. I was informed by two or three farmers, that if I would crack the stones in the spring and plant the kernels, they would come up. I tried that plan and made another entire failure. And just about that time I read in the Cultivator the remarks of an eastern farmer on the subject; in which he impressed the idea that *nature's plan should be followed*, and that nature's mode of propagating peach trees is to drop them from the tree when ripe, and to cover them with washing rains, the rooting of hogs, or the leaves of the tree. So that he inferred that peach stones *should be buried as soon as taken from the tree before they get dry*. He then gave his own experience to prove the correctness of his reasoning.

Immediately upon reading his remarks, I remembered having selected stones and planted a nursery for my father while I was a boy, and that I had accidently managed it as this eastern farmer directs, and the stones all came up and afterwards made a fine orchard. I have since planted some stones in the summer as soon as gathered, and have succeeded in getting a stand.

FRANCIS H. GORDON.

Clinton College, Dec. 28, 1839.

EXTRACT FROM AN ACCOUNT OF AN AGRICULTURAL EXCURSION INTO ST. JOHN'S, BERKLEY, [S. C.] BY THE EDITOR.

From the Southern Cabinet.

The parish of St. John's, Berkley, is long and narrow, extending from the Eastern branch of Cooper River to a short distance above the Eutaw Springs, a distance of near 50 miles. Its eastern boundary is the Santee, and its western, the parish of St. James, Goosecreek, embracing the western branch of Cooper River. The lower section of this parish includes some of the finest rice plantations in the state. But of these it is not our intention, at present, to give any account, and we shall, therefore, confine our remarks to middle and upper St. John's. The soil of this parish embraces almost every variety, with perhaps the exception of the stiff clay. In the lower section, the clay preponderates, so far as to form what may be termed a clayey loam. In the middle, much of the land cultivated is a light sandy loam, while in the upper part, the sand predominates, forming a very light soil. In this classification, we of course confine ourselves to the highlands under cultivation. Throughout the whole parish, pine barrens abound, and along the Santee, and in other places, portions of the swamps are reclaimed.

The crops cultivated are cotton, corn, peas, potatoes, groundnuts, (in small quantities.) and rice in sufficient quantities to supply the demand for family use. Cotton of course, is the principal crop intended for market, while the others are generally planted only to meet the demand of the plantation, though we were happy to find that on some plantations, corn was also one of the crops raised for sale, and that it was profitable.

We were sorry to find, that no rotation was adopted, but that usually, the fields supposed best adapted to the culture of particular crops, were selected for these crops, and under such were kept with little variation. Yet to such an extent do they now carry the manuring system, that these fields, with the exception of those cultivated in potatoes, have actually so improved as, in some instances, to yield from 50 to 100 per cent. more than formerly. This has been brought about, as we have already stated, by manuring, and in nothing were we more pleased than to find how universally this practice has been adopted, and how strenously all are engaged in this laudable work. When we first visited St. John's, so little was the system of manuring appreciated, that the few who had commenced the practice systematically, were actually laughed at by their neighbors as visionaries—not that manuring was wholly unattended to, but because they thought it impossible to manure the whole of their crops. Little attention, therefore, was paid to the subject. What little manure was made, was placed in meager quantities around the corn, or some crop near the homestead, and the clearing of new land was relied on to supply the places of those fields which were worn out by constant culture. In this respect, we were happy to find there had been a great change of opinion, and consequently of practice. On every plantation we visited, (and we have understood, on all or nearly all,) the collecting, preparing and applying of manures, is considered of primary importance, and is now conducted systematically. The manure most used, is what is here called "*compost.*" It consists of quantities of leaves, gathered in the woods and carted into the stables, cattle, sheep and hogs' pens, and from thence into the fields. A specific number of hands and carts are set apart for this work, and on no account (on most plantations) are they diverted to any other. Dr. Ravenel has one cart and mule, with the driver, and two young negroes, (a girl and boy, who could not be employed advantageously in the fields,) constantly engaged in hauling in "*trash*," consisting principally of pine and oak leaves, raked up in the woods adjoining. The distance is not great, and with this one, thus employed throughout the whole year, and the use of two ox carts, for five or six weeks in summer, he manages to keep every thing well littered, and to make about 15,000 ox cart loads of manure, each load averaging about 50 bushel baskets. On this he pens about 60 head of cattle during the winter, (all of which he regularly feeds,) and about 150 to 160 during summer, about a dozen or more horses, a tolerable large flock of sheep, and a number of hogs.

Major Porcher and Mr. Joseph Palmer keep four carts constantly at work, but the distance they have to cart is greater. We did not ascertain the number of animals penned by either of these gentlemen. At Major Porcher's, we saw a quadrangular pile of manure, taken from the *stables* alone, the base of which would measure from 80 to 100 feet, and which was from 5 to 6 feet high. That from the cowpen we did not see. We regret we had it not in our power to visit the plantations of Messrs. Joseph Palmer, Jas. Gailleard and Thos.

W. Porcher, all residing in the upper part of St. John's, and all actively engaged in manuring their lands and improving their crops. We had, however, the pleasure of meeting these gentlemen after our return, in this city, and from them we gathered a few particulars, relative to these.

From the vast amount of new vegetable matter (and that not of a kind easily decomposed,) carried into the pens, the relative quantity of animal manure cannot be large, as may easily be supposed. On some plantations, all of the cotton seed, which can be spared, is spread in one of the pens, and this manure is then used for the crop to which the cotton seed is usually applied. This plan, however, is very little adopted, the cotton seed being more generally applied alone. Others scatter over the pen, a short time before carting out, a quantity of salt; whilst others again, previous to hauling it away, throw their manure into heaps, scattering between each layer a quantity of salt, sufficient to be diffused throughout the whole mass. This manure is highly prized, and its effects have been very gratifying. We shall have occasion to refer to this manure when we come to speak of the crops.

Lime, marl and ashes, are also getting into use, and some small experiments have been highly satisfactory. In some few instances, the leaves taken out of the woods have been at once carted into the fields, and used with benefit to the succeeding crop. These fields are of a clayey nature, and of course the best adapted for such crude manure. It was truly gratifying to us to find how much attention is paid now in this parish to manuring. Many things, which not a few years ago were permitted to lie neglected, and were rather considered nuisances, but not of such a character or in such quantities as to require abatement, by being carried off, are now sedulously sought after, collected, and carted off to the fields at the proper periods, where they fulfil their destiny, by adding materially to their fertility. In such just estimation is manuring now held, and so striking have been the effects, that planters are no longer anxious to clear new fields, unless forced to do so by the want of room. The attention of most of them is turned to the renovating of their old fields, and what a few years ago would have been deemed a hopeless task, is now actually in progress, and fields which were deemed at most unfit for culture of any kind, are now restored to their pristine fertility. In fact, experiments have been stated to us, going to show, that old fields constantly manured, (and in what would be considered but moderate quantities elsewhere) have become more productive, than fields recently cleared. We select an instance furnished us by Mr. Thomas W. Porcher, of Walworth. Among the fields cultivated by him the last year, were three. The first, which we shall designate as No. 1, was considered as nearly worn out when he first took possession of this plantation, ten years ago. Nos. 2 & 3 were newly cleared, and the last year was the second and third of their culture. No. 1 had been regularly planted every year for the last ten, but had also been constantly manured. Nos. 2 & 3 were not manured, for the second and third years, are deemed the most productive. With the exception of one or two years, when potatoes were cultivated, cotton had been grown on No. 1 every year; Nos. 2 & 3 had also been cultivated in cotton, since they had been cleared. The product of the old field (No. 1) was an average of 170 lbs., that of the new fields (Nos. 3 & 2) 135 and 150 lbs. We find also from referring to our notes, that at Mexico, a field which had been cultivated without rest since 1801, and nearly the whole of that time in cotton, produced 176 lbs. per acre. while the new fields only two years under culture, yielded 77 and 109 lbs. per acre.

THE JERUSALEM ARTICHOKE.

From the Ariculturist.

Clinton College, 20th Nov., 1839.

Messrs. Editors:—For the satisfaction of all who may feel an interest in the culture of the Jerusalem artichoke, I am disposed to give them, through your paper, so much of its history and mode of culture as I have learned. Having about 20 acres of this valuable product myself, I am often interrogated as to its nature, value and culture.

Its botanic name is *Helianthus Tuberosus*, and is supposed to have been originally discovered first on the borders of the Gulf of Mexico; whence it has been carried and cultivated in Europe for the table and for food for hogs. But it does not appear to be so productive in England, where it has been cultivated to advantage, as it is here. There five hundred bushels to the acre is considered a large crop, but here I am satisfied that one acre of common soil, the second year after planting it, will yield at least 1000 bushels, and many acres will overgo that amount. So that its native country is best adapted to its production.

The race which I have was discovered about 7 years ago, in Jackson county of this state, by Mr. Samuel Young, and from its correspondence with the description of the Jerusalem artichoke, I unhesitatingly pronounced it the same. Before discovering the Jerusalem artichoke, Mr Young. had cultivated for his hogs the common white variety (*Cinara Colymus*) and finding no profit in them, had abandoned their culture. During last spring, about $\frac{1}{8}$ of an acre of the Jerusalem artichoke was discovered on the farm of Harris Tuggle, of Wilson county. Mr. T. had seen them in his field for several years, and regarding them as noxious weeds, had tried to exterminate them without success. But when he found by comparing them with mine, that they were artichokes, he set a different estimate on them. From the farm of Mr. Young, various persons have obtained and cultivated them as food for hogs, all of whom unite in their praise. And the accounts given of their productiveness and value in feeding hogs are almost incredible. Yet the statements are made by men of unquestioned veracity, and the accounts of all who have tried them correspond, so that we can hardly disbelieve. In the spring of 1838, a neighbor of mine, who is incredulous to any report which has the appearance of extravagance, having heard of the products of the artichoke, remarked that he thought it looked like "too many squirrels up one tree." But when he came last spring to dig some for seed out of my patch, he recalled what he had formerly said, and gave it as his opinion that it was equal to its representation. The great advantage of the artichoke is, that it contradicts the assertion, that "there is no royal

road to wealth," for it will yield considerable profits almost without labor. You have to plough the ground well in January, February March, (the earlier, the better) and immediately check off 4½ feet each way, and propping one artichoke in each check, cover them with the plough. About the time they come up plough them like Irish potatoes, and then again cross plough them about one foot high and you are done cultivating them for ever. The first year they will make from 400 to 700 bushels per acre, and afterwards they will improve for two or three years, till they will yield about double the product of the first year. I now speak from experience. The hogs being allowed to root them all the winter, is an advantage to them, because they root up and soften the soil to a great depth and the artichokes will fill the soil as far down as it is pulverised. Thus they improve for several years, enough always being left by the hogs to set the ground completely. And lest some one should object, that they might freeze if planted in the winter I remark that this artichoke will freeze and thaw all the winter and still be as good in the spring as if it had been in a cellar. The only way in which it may be injured is by exposure to the air long enough to let it get dry, when it withers up to a hard stick. Hence, in transporting them, we have to keep them moist, in order to preserve them.

Your hogs should not go on them until about the first of November; when the trouble of feeding is over till spring, for each hog "roots for his living."

Sows with suckling pigs should not go on them, for the artichokes injure the qualities of the milk, so as to make the pigs dwindle. But as soon as pigs are weaned, they will do finely by rooting for their living.

Heretofore, I have given artichokes to all who desire them, and still give to my neighbors who will dig them; but being often called on by persons at a distance, I propose to accommodate them, in a manner that will take care of number one. Wherever persons will unite and take a wagon load I will send a load. I can deliver them at Gallatin, Nashville, Franklin, Columbia, Murfreesborough, or McMinnville for $2 per bushel, 5 bushels being enough to plant an acre.

I am decidedly of the opinion that this artichoke will form a valuable accession to the husbandry of the western country; because every farmer may keep his hogs through the winter without labor, by devoting rugged parts of his farm, or some thin woodlands to artichokes.

FRANCIS H. GORDON.

SUGGESTIONS TO PERSONS ABOUT TO COMMENCE SILK-CULTURE. REQUISITES FOR EXPERIMENTS. THE NECESSITY FOR EGGS FROM HEALTHY STOCK, AND THE MEANS OF OBTAINING THEM.

Deeming that the establishment of silk-culture as a regular branch of agricultural employment will be of great importance to the interests and prosperity of the United States in general, and especially of Virginia—and that this is the most favorable juncture that ever has or may ever again occur for the commencement of many and extensive experimental operations in this new business—we hope to be excused for repeatedly attempting to enforce the importance of the subject, and to induce as many as possible now to prepare for a first experiment, and with such means, and such care, as will make their success almost certain. If our advice can have any such effect, it can not be later than this time; for perhaps before another monthly publication shall issue, it will be too late for persons then desiring it to *commence* preparations, and especially to secure the possession of *good eggs*, without which requisite for success, the results of the experiment, (whether as to information or product,) will surely be failure and loss, disappointment and disgust.

One very important and widely extended means for beginning silk-culture this year, never has before existed, and perhaps never will again. This is the great superabundance of morus multicaulis trees of which not only the leaves, but the trees themselves, can now be obtained for almost nothing. This state of worthless superfluity, caused by the madness, and after prostration of the speculation in trees, cannot continue; for, if worthless for sale, the plants will not be preserved by any but those who will use them for feeding, and who will therefore know their value. They will not be permitted to occupy valuable land, and others will generally perish by neglect, or be destroyed by grazing cattle, and, whether silk-culture be established or not, there will not long remain any superabundance of these trees.

Owing to this and other existing circumstances, almost every person in the country who has a spare room, or can put up a log-house (which would not cost $20 to build,) can this year make an experiment cheaply. And if the first trial is as successful as can be reasonably expected, considering the necessary imperfections of every first trial, then the experimenter will be prepared, both in experience and other means, for a larger and properly conducted business, the following year.

We are gratified to hear every week of more and more extension of operations in feeding designed in lower Virginia this year; and we are already satisfied that, even in this year, silk-culture will be a business of some importance, as to the number and extent of operations. Still this approaching to the end desired, makes us but the more anxious (because inspired with more confidence) in urging on others to follow the example, in small and *carefully conducted* experiments, and thus to plant the seeds which will furnish a harvest of a hundred-fold increase of operations the succeeding season.

It is essential to success and to the satisfaction

of the experimenter himself, that he should carefully and properly conduct his operations. This all can do, though it may not be convenient to all to be so methodical and systematic, as to fully instruct and convince others as well as themselves. But there are many individuals who can properly and regularly observe and note down, as well as conduct their operations, and they can perform the important service to the public interests of proving, and placing beyond all controversy or question, either that silk-culture is certainly profitable as an extended and regular business, or that it is *not* so. The latter proposition, if true, will be only secondary in importance and value to the former. The truth, whichever way it may be found, should be the only object sought; and such experiments as we recommend would be the sure and speedy means of reaching that end, in one or the other way.

Though there have been already made, and reported, some very interesting and valuable practical and even extensive operations in silk-culture, (and which have been published in this journal,) still there is not one of them that was not defective in some important particulars, which more careful observation might easily have supplied. We request of all our readers who design to feed silk-worms methodically this year, to select some one or more broods, and to observe minutely and write down every circumstance that may effect the result, and afterwards to report to us the results. Any number of such reports can be thrown into a tabular form, so as to present at one view a comparative statement of the progress and results of all the different operations. To induce more regularity and uniformity in such experiments and reports, we will here suggest the matters which are either essential, or, if not essential, at least desirable to be known, in experiments that can be considered as at all conclusive.

The facts which should be observed and regularly noted, in a full and complete experiment of silk-culture, we deem to be the following:

1. What variety of silk-worms—the weight of eggs put to hatch—and the weight of worms to be fed immediately after being hatched, (to be ascertained by weighing the refuse eggs, and paper or cloth,)—or by any mode to show, as nearly as may be, the number of worms at the commencement.

2. Dimensions of feeding apartment—plan of management and space (in square feet) of shelves used.

3. Description and quality of land occupied by the trees fed from, and its rent or value.

4. Number, age, and description of trees.

5. Number and kind of laborers employed, and the cost for preparation and cultivation of land, gathering leaves, and feeding, stated separately so far as may be, or otherwise altogether.

6. Weight of leaves used—and of the unconsumed leaves, litter and excrement taken out, during the whole feeding.

7. Temperature of feeding apartment observed at, and before sunrise, 2 o'clock P. M., and 9 P. M.—changes and state of weather—and when artificial heat used, if at all.

8. The product stated both in bushels and pounds of cocoons, and of average number of cocoons to the pound, by weighing and then counting a bushel, or a peck. They should not be divested of their floss before being weighed, and the measure should be heaped. If flossed, it should be so stated, and then the measure should be even.

In addition to reports presenting the above facts, or as many of them as can be observed, (and of which many reports might be consolidated in one table,) it would add much to the value of any reports, that are otherwise full and complete, if accompanied by a minute diary of poceedings and progress, during the whole time of feeding.

An experiment may be very interesting and valuable, though it may not present half of the above particulars; and therefore we mean not to discourage the making and repeating observations, though much more limited than the most complete experimenting would demand. To make a complete experiment, or one embracing properly even *nearly* all the above particulars, would certainly be very troublesome. But it would require but 35 to 40 days, altogether, and the results would amply compensate the experimenter, by giving certainty to his subsequent operations; and the combined reports would be of far greater value to the public.

All persons who desire to make accurate experiments, on the *safest* larger operations, as a matter of business, will do well to use eggs of some variety of worm known by experience to be of good quality, and, also, of medium or ordinary size. We object to all the "fancy" varieties of "mammoths" or others, for general, or for first operations, though we would advise others to do as we are pleased to do in that respect, that is, to try a few of any highly prized or new variety, and observe and compare them with the more common and known kinds. We repeat that above all things it is important to breed from a healthy stock; and no one ought to rely on eggs from an unknown or doubtful source, if he can possibly obtain such as are from a stock of known healthiness, and which have been properly kept. There will

be in market a glut of silk-worms' eggs, of some kind or other—and of all prices from $2 to $30 the ounce. Still, for want of a proper system being established, as to demand and supply, and the general want of knowledge and care for the preservation of eggs, even when of good and healthy stock, probably nine-tenths of all the good eggs will be spoiled, or lost by hatching on the hands of the holders, and yet perhaps nine-tenths of all buyers be supplied with such as were diseased, if not worse than worthless. Under existing circumstances, therefore, any person who has the proper knowledge and known ability, will render an important public service who will supply purchasers with good eggs at moderate prices. We have urged and induced our friend Thomas S. Pleasants to undertake this business to such extent as he can furnish a supply of eggs that he knows, and can warrant the good quality of. In pursuance of this suggestion, his advertisement will appear on the cover of this number. To all who know Thomas S. Pleasants, personally, or by report, it is totally superfluous to say, as we here do for the benefit of strangers, that any one who may send an order to him, either special or general, may rely, with entire confidence, on his careful attention and correct judgment, as well as in regard to the more important qualities to justify such reliance.—Ed. Far. Reg.

ON THE CULTIVATION OF IRISH AND SWEET POTATOES.

To the Editor of the Farmers' Register.

Beaufort Co., N. C., Jan. 30th, 1840.

Having been successful for the last five years in raising good crops of Irish and sweet potatoes, I have concluded to accompany the subscription money with a short description of the mode of culture, &c., of those roots; which, if you think it will be of any benefit to potato growers, you can publish in the Register.

The ground preferred for Irish potatoes, and such as I have experimented on, has been stubble, grass, or old field, which for many years have been uncultivated and considered too poor (without manuring) to pay for working it. Early in the winter, or as soon after Christmas as possible, the ground is broken with a large two-horse plough; the first of March it is again ploughed into three-feet beds with a small No. 2 Freeborn plough; a deep furrow is then opened on the beds, which being nearly filled with manure taken from the compost heap, composed of leaves, virgin mould, or swamp mud, and a small quantity of barn-yard manure, the seed is deposited 8 or 10 inches apart, taking care to select good seed, and leaving from 2 to 3 eyes on each piece; after the dropping is completed they are covered by running a furrow on each side with the same plough; as soon as they come up and get 4 or 5 inches high, they are again ploughed, and with the hoe carefully "ridged down," leaving the top bud out. Nothing more is done to them until we commence digging, which is generally about the 15th of May.

Many of my neighbors say this preparing compost manure is too much trouble. But permit me to say to those who have never tried the experiment, that the potatoes grown in this kind of manure are so much superior in quality they will never regret the trouble. I do not recollect of ever seeing a single potato with a black ball in the middle of it, which we too well know is often the destruction of whole crops raised in stable manure.

The sweet potato I have generally planted on the same kind of soil, which I prefer having broken up in the fall. The 1st of May the ground is again ploughed, forming lands by throwing 5 or 6 furrows together, and with the hoe we form a ridge or hill from 18 to 24 inches in height. The last spring I tried an experiment with manure from the drift thrown on the shore by the storm of 1838. The lands were opened by running a deep furrow with a large plough, the river grass and drift were placed in small piles two and a half feet apart, and over which a hill of earth was drawn. When ready for planting, a deep hole was opened in the top of the hill, and too good pieces of the plantings placed in it, taking care to separate the seed 2 or 3 inches in the hill. If a heavy baking rain should fall on the hills before the earth becomes settled on the top of the hill, we draw a small rake across the top, which breaks the clods and admits the tender bud to make its appearance. Before adopting this plan I had been often disappointed in my potatoes not coming up. The manure was put in every other row, and if I had not been present this fall when they were dug from the ground I could not have believed the small quantity and quality of manure could have made such a difference. I think the quantity was nearly double from the manured row over those having none; and I flatter myself the next crop of corn on these manured potato rows will be equally good. From this experiment I have come to the conclusion that coarse unrotted manure will return us more profit in applying it to the potato crop than any other, and will leave the ground in a fine state for corn the next year. J. B. M.

ON THE PROFITS OF SILK-CULTURE IN VIRGINIA.

To the Editor of the Farmers' Register.

I will venture to give your readers another short communication on the subject of silk culture; but as I fear many of them regard this branch of husbandry as a "duck and chicken" affair, and are indisposed to give it a careful examination, I now promise that they shall not hear from me again until January or February, 1841, when I hope I shall be able to communicate the knowledge derived from another year's experience. I do not wish to give to this business an importance that does not belong to it; but with Virginians, it seems to me, it should occupy the next place to wheat and corn, and that it should supplant tobacco. Abundant crops of wheat and corn are indispensable to our safety and prosperity. Merchants, manufacturers, mechanics, and professional men, cannot prosper if the crops of these *necessary* grains fail; and they should all unite cordially with

farmers in endeavoring to improve the condition of our agriculture. The cotton planters of the south, too, have learned from recent experience, the danger of neglecting the culture of corn, and they will no doubt profit by it.

I will now take up a question relative to silk culture, which is of the first importance, viz., can the citizens of Virginia and the old southern states compete successfully with France and Italy, in the production of raw silk? That we can compete with China and Turkey is proved from the fact that American silk sells for $1 to $2 per pound higher than that of China or Turkey.

The subject of manufactures, I am not prepared to examine; and I shall not attempt to show that we can compete with other nations in that branch of the silk business. Let us produce raw silk in abundance, and profitably, and we may safely leave the competition with foreigners, in the manufacture of silk, to our northern brethren. They will in due time adjust that matter with other nations, and become the purchasers of a large portion, and perhaps all the raw silk raised in the United States.

In the extracts from Young's Notes on the Agriculture of Lombardy, published in the Register, (Vol. 7, page 274,) there is a statement which I have found difficult to reconcile with other facts stated by Young; but as I think I have solved the difficulty, I will first give the extract to which I refer, and then my explanation, and if my version shall appear to you erroneous, I shall be pleased if you will correct it.

The extract from Young is as follows:

"The following is the account of the profit and loss of six ounces of seed, for three years, at Vicenza, by Sig. Carlo Modena.

I shall only quote the account for the year 1778, that being all that is necessary for my purpose.

Expenses.	*liv.*	*s.*	*den.*
Semenza—seed, 6 oz. - -	36	0	0
Foglia—leaves, 26,475 lb. - -	1545	4	0
Spesa—gathering leaves and attendance, - - - - -	868	16	0
Filare--spinning 992 lb. cocoons, which give 159 lb. 5 oz. silk, -	557	18	0
	3007	18	0
Produce.			
159 lb. 5 oz. of silk, - - -	4144	15	0
Refuse ditto, 41 lb. - - -	102	10	0
Seed, 55 oz. - - - - -	330	0	0
	4577	5	0
Expense, - - -	3007	18	0
Profit, - - - -	1569	7	0"

1. The 6 ounces of seed is one-half of the large Italian pound of 28 ounces, or 14 ounces avoirdupois. Without this interpretation, the statement is utterly irreconcilable with other facts detailed by Young, and it is also rendered necessary by the product in silk, that being 106 pounds of 16 ounces, or about 7½ pounds of 16 ounces to each ounce of seed, which is a fair average of the silk crop in Italy.

2. The quantity of leaves consumed, was 26,475 pounds of 12 ounces, or 19,857 pounds of 16 ounces, the 14 ounces of eggs producing 400,000 silk-worms, which consumed about 50 pounds of leaves per thousand.

3. The consumption of leaves (19,857 pounds,) cost $289 69, or rather more than a cent and a quarter per pound. Now, if Young reported correctly, and if the printer has not made a mistake, and further, if Sig. Carlo Modena did not make a false and wicked statement, (and self-interest did not call for it, but rather the reverse,) the culture of silk, with ordinary management, will prove nearly as profitable in Virginia, as in Italy, under the supervision of Modena and with a regulated temperature, and I predict that you will not sell 3200 pounds of mulberry leaves for $4, unless you do it *pro bono publico*.

4. The *filare*, or spinning, includes with the reeling on the Piedmontese reel, twisting by the throwsting mill, to reduce the silk to what is called *organzine*. Both of these operations cost in Italy (according to my understanding of Modena's account) one dollar, to one dollar and sixty cents per pound, of 16 ounces, the expense varying with the quality of the cocoons. For example, the reeling of 90 pounds of silk (16 ounces,) in 1780, cost $53, or about 60 cents per pound, and reducing the same quantity to *organzine*, cost $85 or about 95 cents per pound. This operation is more expensive than reeling, but not only the actual expense of the operation, but a fair profit is added to the price of the silk. That the 106 pounds of silk, (16 ounces,) or 159 pounds (12 ounces, was *organzine*, is evident from the price named, which is equivalent to 7\frac{70}{100}$ per pound of 16 ounces.

The price of reeled silk or raw silk at that period in Italy, according to Young, was about $6 per pound of 16 ounces.

5. The cost of gathering leaves and attendance was $162 or about $11 50 per ounce of seed. For $11 50 per ounce of seed, silk-worms can be raised in Virginia with hired labor, and using the morus multicaulis in the hedge form, or about $1 40 for each pound of silk. Now, if we will take an acre of poor land that will sustain the worms from 2 ounces of eggs, and produce 16 pounds of silk worth $80, and deduct $23 for rearing the worms, $16 for reeling cocoons, and $10 per acre for cultivation, it will leave a net profit of $31 per acre. The expenses named, are larger than necessary, especially the cultivation of the trees, and the product moderate, and yet it shows a profit sufficiently large, to prove that this culture would enrich Virginia if pursued by our farmers on a small scale, and in subordination to crops of grain, hay, &c., which are indispensable.

6. Sig. Carlo Modena paid for seed $7; for leaves, $289; for spinning or reeling, and reducing to *organzine*, $103; for gathering leaves and attendance, $162; and yet realized a profit of $294 from 14 ounces of seed, or $21 per ounce. If this is not a fable, (and who will show that it is?) the culture of silk is of incalculable importance to Virginia, and the old southern states. There is no need of retreating from poor lands any longer; and I say to all farmers who can conveniently spare land and labor, plant mulberry trees of the best varieties, and take care of them. The time is near at hand when it will be seen that they constitute valuable property. The country will not be overstocked with them for years to come, if

they should be appropriated to their proper use, the production of raw silk.

LAYTON Y. ATKINS.

Stafford County, Va., Feb. 1840.

PREMIUMS AWARDED BY THE AGRICULTURAL SOCIETY OF CHARLOTTE.

For the Farmers' Register.

The editor of the Farmers' Register will please insert the following premiums awarded by the Agricultural Society of Charlotte, Virginia.

To Henry A. Watkins $5 for the best brood mare, Ebony by Roanoke, dam by Bluster. Also $5 for the best two-year old filly, by Emancipation, dam Ebony.

To John Marshall $5 for the best two-year old colt, by Emancipation, dam by Roanoke. Also $5 for the best one-year old colt, by Emancipation, dam by Roanoke.

To Hilary Richardson $5 for the best suckling colt, by Shark, dam by Medley.

To Thomas E. Watkins $2 50 for the best saddle horse.

To Col. J. P. Marshall $2 00 for the best milch cow, Scott, three-fourths Durham. Do. $2 00 for the best beef. $2 00 do. for the best three-fourth Durham heifer, and also $2 00 for the best ram.

To Major Wm. Gaines $2 for the best bull, Tom Powell, by Medley.

To Hilary G. Richardson $1 00 for the best boar, of the Berkshire breed, and $2 for the best Berkshire pigs.

To Col. J. P. Marshall $2 for the best brood sow.

R. J. GAINES, *Sec'ry.*

REMARKS ON DIFFERENT SCHEMES OF ROTATIONS.

To the Editor of the Farmers' Register.

Not many years since, a controversy was warmly manifested in your journal, between two parties of agriculturists on the lower James River, on the comparative merits of the three and four-shift systems of husbandry. Among the most distinguished of the disputants, was Mr. Hill Carter of Shirley, than whom no one in our state enjoys, or is entitled to, a higher reputation as a farmer—as far (at least in my judgment) as consists in the carrying out, and thorough execution of his plans; for which he possesses in an eminent degree the advantages of a fair theatre, extensive means, industry and intelligence. I observe in the December No. of the Register, (the last I have received,) a communication from Mr. Carter in which he condemns his favorite four-shift rotation. This, I have long been prepared for, though I am sorry to find that the unfavorable result of his experience has been ascribed by us to different causes; leading him as I see to reserve the most objectionable feature of the system he abandons; I mean the three successive grain crops. This, I am the more surprised at, that the object aimed at is to get rid of insects; particularly, I presume, the chinch-bug, which is undoubtedly the greatest scourge that has ever visited the crops above the falls. This insect feeds exclusively on grain crops as long as there is the least succulence in them, and then preys on the spear grasses which grow among them; never, that I have seen, touching clover. But the nursery afforded for three consecutive years to insects, is not the greatest objection (perhaps) to the system. I believe that to keep up the supply of pabulum necessary for any crop, but particularly wheat, it is important to alternate plants of different characters, as well as to introduce an ameliorating crop as often as can be done with an eye to the desideratum with all proprietors of the soil; I mean, advantage to the land as well as to the purse. To this end, none is so convenient or useful as clover, none so well calculated to arrest the encroachments of pests, both of the animal and vegetable kingdom, or of poverty, that most depressing of all evils.

I have always considered the "*beau ideal*" of an improving, and at the same time profitable system, the *five-field*. But not with Mr. Carter's *rotation;* in this we differ radically. Not only as regards the consecutive crops of grain, but of clover and the *kind* of grain which follows it. Under Mr. C.'s rotation, wheat succeeds the *second* year's crop of clover. This I think is objectionable on account of the pests which spring up in the second year of the maturity of clover. If for the sake of improvement to the land, or for grazing, I wished to give two crops of clover to a field, I should do so under a six-field course, viz., clover, clover-pasture, corn, wheat, clover, wheat. This is undoubtedly one of the most improving and profitable systems to the grazier and farmer, who have large tracts of uplands. But to the *farmer*, (without the other branch of the profession as with Mr. Carter,) and much less to the farmer and *planter* as with *us*, it will not answer; *at least*, I speak for myself. To return from a digression to my *perfection* of a five-shift rotation, *i. e.* clover, corn, wheat, clover, wheat. This gives two fields of clover and two of wheat, with the advantage of a regular alternation. The stubble fields to be gleaned by hogs, and moderately trampled by cattle—the first chiefly for the benefit of the hogs, the latter of the clover, which is the better for having the earth settled about it before the winter's frost sets in; and in puffy lands is also measurably protected from the usual drought of July and August.

Both clover fields to be moderately grazed* after the 20th June the second year, by a stock only sufficient for the purposes of the farm—the field for fallow first. The two fields thus afford grazing enough for the stock, and have left on them more clover than is taken off—trampled too to a degree, which is beneficial to the succeeding crops, as well on account of the settling of the clover, facilitating in some measure the operation of ploughing, as from the pressure of the hoof promoting the productiveness of the soil; for I agree with Mr. Carter in the opinion that some trampling is indispensable to a good product in wheat. To this system, as to all others, I consider a standing pasture an important aid, even though it be such a one as *I* have attached to a three-field course, which a friend (Dr. J. M. M.) characterizes *a short bite.* Being large, this serves my stock, with the aid of lots for favorites, until

* Unless one is reserved for cutting hay and seed from.

the clover field is ready, and *afterwards* for its relief in wet weather.

These remarks, Mr. Editor, although drawn from me by my friend Mr. Carter's communication, are by no means offered as a commentary, and I am *sure* will be received by him in the spirit they are written. He very properly is actuated by a sense of duty to a community which *justly* looks to him as a bright examplar in our profession. *I*, by an assumed obligation as a subscriber to your Register, to express freely my views on agriculture, that may (for what they are worth) at least elicit discussion on a subject which wants light.

RIVANNA.

THE FIVE-SHIFT ROTATION.

To the Editor of the Farmers' Register.

Chericoke, Jan. 15th, 1840.

I have now for some years been experimenting on the different rotations, of the three, four, and five-field systems, and although my experiments have not been of sufficient duration to arrive at conclusions, that may be as satisfactory as they would have been, or as I think they will be at a future day, and I had not designed communicating their results until I had carried them further; but being so entirely convinced myself, and seeing that some of my James River friends have altogether come into my views, thereby removing heavy authority against me, I have not deemed it necessary longer to delay what was my intention at a future day. For surely whatever can be done for lowland Virginia farming, should be done quickly; and although I doubt if many, or indeed any, will be so far satisfied by the results of my experiments, as to adopt my views instead of their own, still I think it my duty to communicate that from which I have derived benefit, and others may, if any will practise, and at least my testimony may strengthen that of others, entitled to more weight.

In 1824 I moved to the place where I now reside, and commenced farming. I found the farm cultivated after the then universal mode followed in this section of country, the three-shift system, to use the provincial term; (if they had called it the make-shift system I dare say it would have been a better one.) This system, if system it can be called, I followed up diligently for some years, making and using all the manure the farm afforded, and this was what we called a good deal, and all other means which I then knew of, for enriching land. But notwithstanding all my efforts, to my surprise, I found my crops did not at all increase, the corn crop remaining at about the same as when I took possession of the farm, and the wheat crop evidently, I think, declined. Finding that my income did not at all answer my expectations, and not likely to answer my wants, I determined after giving the three-shift system, as I thought, a fair trial for 7 or 8 years, to abandon it, and at once to cut each field into two, so making six fields out of the three. One I kept as a standing pasture, to aid the other field which came into pasture in the regular rotation of the five-field system, which I then determined to adopt, fallowing one each year for wheat. This is now the beginning of the 8th year since I commenced this system, and the one-sixth produces more wheat, or corn, or grass, than the third formerly did. My land has been regularly improving, as well as my crops and income from the farm. I do not know but that the income of the farm is approaching to double what it formerly was. I should add though, that for the last five years I have been marling, by which my land has been greatly benefited; but, as I shall presently show, the improvement is not altogether attributable to the marl; as I have another farm under a different system, where marl has been much more freely used than the one on which I reside, which has not improved in the same ratio at all. When I decided to change my practice of farming, or to innovate upon the old three-shift, I reflected maturely upon the several systems that were followed in different parts of the country. I first brought in review Arator's four-field rotation, but the results I had witnessed from that course I was not well pleased with. 1st. Because the land gave no adequate return in small grain; and 2dly, because I was fully satisfied in my own mind, that the full benefit from clover could not be derived, unless the crop was turned in at maturity, that is, in the way of summer fallow, before the substance of the plant was all, or nearly all, washed away by repeated rains, and evaporation. From my experience I should say, the most judicious time of turning in the clover crop was when the first crop had fallen and dried, and the second had arrived at full maturity, the head ripe enough for seed, but the plant not dead. The substance of the first crop still mainly in the stalk, and the second in its recent state, thereby deriving the full benefit of the dry and green crop.

I next thought of the four-field system as pursued by some distinguished farmers on James River; but this too to me had very strong objections, notwithstanding the very high encomiums passed upon it by some gentlemen of known talents and skill as practical farmers, and whose experience and correct observation was much beyond any thing I could pretend to lay claim to. Indeed such was my confidence in those gentlemen, that I was at one time almost tempted to yield my own opinions to theirs; but I could not be convinced but that three grain crops in four years, was too severe a rotation for almost any land to bear, unless it was already rich, and a good dressing of manure could be applied to each crop, which I knew could not be done in our country, and that although it might answer on the more fertile lands of the James, I was well aware that on the sandy soils of our Pamunky flats, it would not. I was always too fully persuaded that the sandy nature of our lands required grazing once in the rotation, for the double purpose of cleaning and trampling the soil, thereby rendering it more compact, and retentive of moisture and manure. And again, our light, warm soils, however deficient they may be in the production of natural grasses when enclosed, are certainly not in weeds, which I am yet to be convinced are of any benefit to the land, that is, that they do not take from the land more than they give back, unless it is as pabulum for marl or lime to act on, as vegetable matter is essential in some shape for the well acting of calcareous matter. But when superadded to my own views and opinions, I saw from a statement of John A. Selden, esq., of Westover, that a farm in Curl's Neck, which had the advantage

of being originally good land, and I knew had been cultivated by good and judicious farmers, in 19 years had only arrived at 7 barrels of corn per acre, under this, his favorite four-field fallow system, I abandoned that also. I then determined that the five-field rotation was the shortest upon which any judicious system of agriculture could be based, and this I now believe too short by one.

My rotation is, 1st, corn, 2nd, oats and wheat, enough of the former for the use of all the horses, &c. on the farm, then by selling that amount of corn, oats being a more certain crop after corn than wheat, 3rd, clover, and fall fallowed for wheat, 4th, wheat, and this spring I sow orchard and other grass seed with the clover for pasture the next year, 5th, pasture, and as soon as I can improve my standing pasture sufficiently to bring it into the regular rotation, I shall say, 6th, pasture. I would lengthen the rotation, first, because I do not think the one field will support a sufficiency of stock to consume, or convert into manure, the stuff made on a productive farm, and secondly, I do not think that 18 months, the time from coming off the oats and wheat, to its being fallowed for corn, is long enough for the reformation of the soil after the grain crop rotation, which I think is, or should be, a *sine qua non* in all rotations, as all who have paid any attention to soil must have noticed the natural tendency of all land to approximate the soil near to the surface, as it is dependent upon light and atmosphere for its formation; and in my opinion the plough should not again be brought into action before the sod is reformed, which will be in two years, in any land that is in any tolerable condition. And this formation of sod is, I think, the test of reformation of soil. In the rotation as lately suggested by my friend, H. Carter, esq. of Shirley, the latter object may be attained to a certain extent, but not I think fully. The objection to his rotation, with me, is bringing three grain crops together, and the one field will not afford a sufficiency of pasture, for a sufficient quantity of stock. I am aware that the opposers of lengthened rotations will bring up Flemish and Chinese husbandry, and may be that of other countries, to prove the superiority and greater profits of the shorter; to those I would say, that with their soil, climate, and circumstances, theirs is doubtless the best system for them. But in all these matters, our situation is widely variant from theirs. I speak only of the county with which I am acquainted, and in which I have operated as a farmer, in the tide water district of Virginia, and what I say is the result of experience, and the best observation my judgment enabled me to make. Others I have no doubt will say, why I sha'n't live six years: that may be; we none of us know how long we are to live. To such as expect to die soon, I would say, lay a good foundation, that your posterity may raise a superstructure upon. To those who advocate the entire non-grazing system, I would remind, in addition to what has been already said, that the weeds, grass or whatever it may be, that is depastured off, is not taken from the land, but is returned in the shape of manure, having passed through the animals; which I should think was much better calculated for its improvement, than a rank growth of weeds, which will have lost the greater part of their fructifying properties by exsiccation and evaporation, before they are returned to the earth. As to the popular notion of covering land being one of the means of improving, it may be true to a certain extent, but certainly not to the degree ascribed to it by some; for if you cover land for several years, and then expose it to the sun in the cultivation of a corn crop, it will not produce so well, as that which has been more exposed, as it will not stand a drought at all, nor the common summers' suns, half as well as land around it which has been less protected; this I have seen fully proved. I therefore infer that land requires acclimating as well as animals, and that if it has to be exposed in the cultivation of the crop, it should not be too much housed at other times. I would also here remark, that I have never succeeded in getting a good stand of clover upon light land, that had not been trampled, notwithstanding it may have been well marled.

I hope none will infer from what I have said, that I am for giving back nothing to the earth in the shape of vegetation, as they will recollect that there is in the system recommended by me, no regular grazing until the fifth year, by which time, as I suppose, the land will become as it were saturated with vegetable matter, and that it is now time to leave it in the earth to become converted into soil. And I would recommend in addition to the clover, &c., a practice that I have followed sometimes with very great benefit, that of sowing the corn land that is to come in wheat, the last time it is worked, in black-eye peas; it will generally give a good green lay, which I think gives to the land about as much as the corn crop takes from it; indeed I have never made a good crop of wheat after corn, except upon a pea fallow. The peas to be sure will not arrive at that maturity, in all seasons, that is desirable before being turned in, but upon good land with a fair season, the growth is generally as much as can be turned in with convenience. It has also the good effect of interposing a leguminous crop, between the two grain crops, as well as that of keeping the land clean of crop grass, the nursery of Hessian fly.

My objections to the four-field system of Arator are not altogether theoretical. With the James River practice I have had no practical experience; but with the first I have, having had under my management for some years a farm which has been cultivated in that way, saving the entire exclusion of stock, although not heavily grazed, and the improvement has not been at all commensurate with expectations. But that certainly is better than the horrid land-killing, profit-starving, three-shift system of lower Virginia. It is true, some have succeeded pretty well with Arator's system, the late Mr. Lewis of Weyanoke, perhaps, better than any one else that has come within my knowledge; but with his judicious management, and eternal manuring, any system would have answered well; but even he did not succeed to any extent before he commenced the use of lime; as in frequent conversations I have had with him upon the subject, he never spoke of the product of any other than his limed land. However successful though some may have been with this system, it does not prove that they would not have been much more so with another, under equally good management. Another unanswerable objection with me to the entire non-grazing plan is that there can be no good system of husbandry which does not raise a sufficiency of stock

of all kinds for the use of the farm, and for the profitable conversion of all the offal into manure.

In the foregoing part of this communication I promised to say something of another farm, upon which I had been following a different rotation from the one on which I live. I will now advert to it. Coming into the possession some 8 or 9 years ago of a farm higher up the river than where I reside, the land being every way equal, naturally, where marl is abundant, and timber scarce, and thinking that perhaps the three-shift system with marl had not been fairly tried, and anxious too to test it with the five, 4 or 5 years ago I determined to do away with all cross fences, and expel the hoof entirely. The fields have now been marled mostly a second time, and the growth of weeds, magothy bay bean, &c. &c. excessive; but the clover does not take as well as it did some years back, indeed the bean smothers and kills the young clover. The corn crop has not improved for several years, and it has nearly ceased to bring wheat; and although under much more favorable circumstances, as to vegetable matter and marling, than the place I reside on, (for a considerable portion of it is still unmarled,) which, as before stated, has been under the five-field rotation for eight years, fallowing for wheat, and grazing the field the year before it comes in corn; the improvement of the soil, or crops, is not at all equal. I think the experiment conclusive as to the merits of the two systems, I shall therefore abandon the one and adopt the other. Nor do I think it matters as to the size of the farm, whether or not we adopt the summer fallow; for if it is correct upon one scale, it must be upon another. But my remarks are not intended to apply to lands that are so light that they will not bring wheat under any course of culture, or management; nor to particular climates or situations, where wheat will not grow; but to the corn and wheat growing districts to which I am accustomed.

Should any be disposed to innovate upon their old three and four-field habits, but are deterred by the fear of losing their income for the first rotation, I can assure them from experience they need not fear it; the increase of the wheat crop will more than compensate for the loss of the corn in the first five years, and after that the one-fifth will produce more of corn than the one-third did. Presuming always that clover is raised wherever the land will produce it, and all convertible matter turned into manure, and applied to the land; and marl or lime, if to be had, to be also used. I would here remark, from what experience I have had in farming, that however valuable putrescent manures may be, and indeed indispensable as they are, that no high grade of product can be expected, upon other than naturally rich, or at least, neutral soils, (that is, when there is no excess of vegetable acid,) without the use of calcareous manures in some shape or other, whether of marl or lime. I do not think that the use of lime as a manure upon our acid soils is sufficiently appreciated, notwithstanding all that has been said and written upon the subject. I think that we can afford to give much more for it than is generally supposed we should be warranted in doing. The only way to test the real value of lime, is to compare the product of land before and after its use with clover; for without the judicious use of clover, with marl or lime, it is impossible to arrive at its full benefit, and when that is done, I will warrant that the increase in the two first crops will more than repay any reasonable outlay that may have been made in lime and clover seed, to say nothing of the permanent improvement of your land; and surely we can't lose by borrowing at 6 to receive 12 per cent.

I am pleased that my friend, Mr. Carter, has varied his rotation from mine, that actual experience may decide the relative merits of the two; whether it is best to bring the three grain crops together, and to depasture the clover before fallowing for wheat, or to interpose the crop of clover between the grain crops, and turning it in, in the recent unpastured state, and grazing before corn. His rotation will have the advantage of mine, as to the five-fields only, in having two years to lay without being disturbed by the plough, that the soil may be the more perfectly reformed; but whether that will compensate for the quick succession of the grain crops, and the loss of the green clover lay, can only be known by actual experiment; as experience, after all, is the only correct teacher. In all other respects our views correspond entirely, and I feel highly gratified at having so able a coadjutor, as his experience is greater than mine, and his authority much more entitled to respect. Respectfully,

C. BRAXTON.

TREATMENT AND FOOD OF GROWING STORES.*

Store pigs, says Mowbray, may generally be fed on almost any sort of food which they will eat, and thus acquire growth; and then for six weeks or two months before they are slaughtered they should be fed on grain and milk which will harden and give flavor to the pork. Through the winter their food will be the run of the barn yard, roots of all kinds (of which every farmer should have a plentiful supply) including ruta baga, and cabbage, with occasional rations of grain of some kinds with wash. In autumn and in a plentiful season swine will subsist on acorns; and in summer on clover, lucerne or tares. Swine turned to shift upon forests or commons are apt to stray and hide themselves for a considerable time; the ancient and ready method to collect them is by the sound of a horn with which they have been accustomed to be fed. Feeding pigs, says Low, are fed on green food of all kinds; and hence clover, lucerne and tares may be employed in feeding them in summer, though to fatten them finally some farinaceous or other nourishing food will be required. They will also graze like sheep and oxen, but grass consumed in this way is not the natural food of the animal, which consists of roots rather than herbage. The feeding of pigs on herbage is merely to carry them on for a time till more fattening food can be procured. When fed on herbage a ring should be passed through the cartilage of the nose to prevent their following their natural instinct of ploughing up the ground, but the same purpose may be more effectually served by divid-

* From the "American Swine Breeder, a practical treatise on the selection, reering and fattening of swine. By Henry W. Ellsworth. Boston 1840."

ing the tendons by which they are enable to move the snout.

"There are two purposes," continues the same author when describing the mode pursued by raising small stocks on some of the English farms, "for which pigs may be fattened. The one is to yield pork which may be used either fresh, salted or pickled; and the other is to produce bacon which is prepared by salting and drying the flesh. When fed for pork, which is the most convenient system in the practice of the farm, the pigs may be reared to the age of six or eight months; when intended for bacon, they must be reared to a greater age and size, as ten or twelve months. When the object is pork, the smaller pig is to be preferred; when bacon is desired the larger class should be cultivated."

In the case of feeding for pork alone, it has been computed that upon a regular farm, with a supply of tares and clover to the animals in summer, and of potatoes and turnips in winter, and with no other feeding than the refuse of the barn, milk house, and kitchen, one pig may be fattened in the year for every six acres of land under corn crop. Thus supposing there are to be 240 acres in corn crop, the quantity of pigs fed annually upon the farm might be 40. To feed this stock, in addition to what they can pick up in the straw yards, about an acre and a quarter of clover, and an equal quantity of potatoes will be sufficient. To keep up the number three breeding swine will be required, of which two should be sold each year, their place being supplied by an equal number of younger ones reared upon the farm. The surplus beyond the quantity of 40, which it is proposed to feed may be disposed of when weaned. This is a method of management practicable upon ordinary farms, *without any interference whatever* with the food and attention required for larger stock.

Another method of management may be adopted. This is to take only one litter of pigs from each sow, to sell the pigs as soon as they are weaned, and immediately afterwards to feed the swine. This will be a profitable species of management provided there is a sufficient demand in the district for so many pigs when weaned.

Mr. Henderson, in his Treatise on Swine, recommends this system. He calculates that one sow for every seven and a half acres may be fatted in this manner. He proposes that the breeder shall purchase in the first place twenty sow pigs and one boar pig which had been born the beginning of June. In the following June all the females will have had pigs. These they are to suckle for about two months. The pigs are then to be sold just when weaned, except twenty-one, namely twenty sow pigs and one boar pig; these being selected from those which are of the handsomest shape, so that the subsequent stock may be kept good and uniform. The farmer will now be in a situation to go on without further outlay of money for stock. In a month after the pigs are weaned and sold, the sows themselves are to be put up to feed. This will be about the beginning of September. The male must then be admitted to them so as to render then quiet and apt to feed, and in two months they will be fat and of a large size.

Now the introduction of a practice similar to this by the cultivators of many of the large farms in the western and other portions of the United States, would be attended with great advantages. It is at once a simple and convenient method, of deriving large profits, from what is generally neglected as wastage—the remaining fodder after the crops have been gathered; and it exhibits most conclusively the good results of endeavoring to *make the most of every thing*. The more general cultivation of the corn crop, and the cheapness of grain, would allow the keeping in the country, of even a larger number than those proposed, at a very trifling advance, if any, in the expenses.

The whole system of European agriculture, and the modes of feeding stock, differ essentially from the practice of this country, and the desirable object there, is often to avoid the use of many articles for food, which the exuberance of our soil renders economical. But a detail of the practice pursued by judicious cultivators, is always valuable for important truths of general application.

Where swine are suffered to range for a great portion of the year, and are confined in the winter to barn yard or small enclosures, Mr. Young advises that the whole number of hogs should be looked over in the month of May, and sorted; such as have attained half or more of their growth, being drawn and turned upon lucerne or clover crops, where they should be kept until the end of September, care being taken that the fences are in good order, and that proper ponds, and other places are provided for the hogs to drink at. Under this management they are found, he says, to grow rapidly, the food in general agreeing well with them, and they are then taken up in excellent condition for fattening. In this mode the hogs sufficiently grown are selected from the sows that have pigs, and weaned pigs, and only the latter left to be fed with the dairy or other wash, with suitable green food, such as lettuces, cabbages, &c., by which a much larger stock of breeding hogs may be kept. The cabbages may be used for the sows that have spring litters, and the lettuce for those that have autumn litters. It is observed that these plants are of great use for sows and pigs, promoting the increase of milk in a great degree, affording assistance where the dairies are small. From the sweet juicy quality of the lettuce, the hogs are not only extremely fond of it, but it becomes highly nutritious. In this way the swine may be well supported, and carried forward till the stubbles are cleared, when they may be turned upon them, and thus the whole year be provided for, in these different ways, with the greatest economy.

REMITTANCES BY MAIL TO PUBLISHERS MAY BE FREE OF POSTAGE.

"A Postmaster may enclose money in a letter to the publisher of a newspaper, to pay the subscription of a third person, and frank the letter, if written by himself." AMOS KENDALL,
Postmaster General.

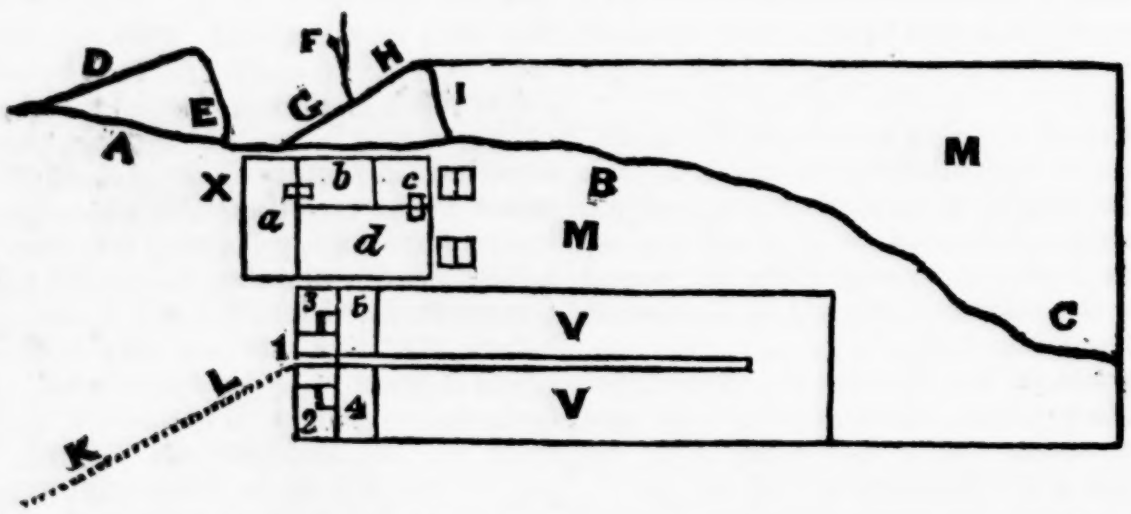
The above extract has been latterly published in nearly all the newspapers and other periodicals of the United States, and there is as much reason why it should be as fully known to our subscribers

as to others. It will be seen that by availing of the right, many of our most careful and conscientious subscribers may save themselves the expense, which many of them pay, of postage on letters containing remittances for subscription—and that others, less careful and scrupulous, who subject the publisher to that unjust and heavy tax, may thus easily save him as well as themselves the cost. It is presumed that no postmaster will be so churlish as to refuse to write his signature to oblige his neighbor. All that the latter need contain to be perfectly explicit, and to come under the above regulation, and which may be written in advance by the subscriber, to save the postmaster even that little trouble, is contained in the following form:

"$———— enclosed, on account of subscription to Farmers' Register for A. B., now received at [or to be sent, if a new subscriber, to] ———— P. O."

As short as is the above form, it contains essential information that is very often omitted in letters containing remittances—that is, stating at what post office the subscriber is then receiving the publication. For want of this information, (when the remittance is sent from another than his usual post office, or by private conveyance,) it is often very perplexing, and sometimes impossible, to find the proper address of the individual payer; and sometimes errors have been committed, by giving credit to another person of the same name—and still oftener, by supposing the payer to be a *new* subscriber, and therefore sending another copy of the work to the post office, which, by the want of precision in his order, was incorrectly supposed to be his proper address. This source of error is still more increased by the names of subscribers, or their post offices, being often incorrectly given in by those who are charged with handing in payments. In all such cases the fault is the subscriber's, and yet the loss is the publisher's. A little more care and precision in giving orders would save a deal of difficulty and loss to the publisher, and sometimes of dissatisfaction and displeasure to the subscriber, on account of mistakes for which he considers the publisher entirely chargeable, when in fact it was owing to his own want of care, or of those to whom he entrusted the conveyance of his payment.—Ed. F. R.

FARM-YARDS. MEADOW. MANURING. PRESERVATION OF TIMBER. FLESH CONVERTED TO MANURE.



For the Farmers' Register.

The above is a fac simile of my horse and cattle yards, meadow, natural streams and conduits. These have been constructed and used about six years, and I cannot conceive how they could be improved, either as relates to structure or economy. A, B, C, is a natural stream running through the centre of meadow; F, is another natural stream, which is emptied into the centre of the reservoir, G, H, and thence into the larger stream, A, B, C, either through H, I, or G, as required. In this reservoir is caught the mould and vegetable matter brought in by the stream, F; also when the stream A, B, C, is smaller, it flows through G, H, I, and deposits mud. The reservoir is nothing more than a ditch about 130 feet long, 8 feet wide, and when empty 5 feet deep; yielding when excavated, and annually afterward, about 175 ox-cart loads of rich mould. Finding this mould very valuable as a manure, particularly when composted in the stock yards, I have determined on cutting another reservoir D, E, on the stream A, B, C, of above double the length of G, H, which will yield about 350 loads annually, all of which being adjacent to my yards, a meadow, and four grain fields, I can with but little labor, use when and where I please.

At F, there is a spring of good water, which is conveyed under ground by means of bored logs to a stop faucet marked X, where it is taken as required for domestic purposes. Thence the water continues under ground to an open faucet, and falls into a trough, one-half of which trough is in the horse yard *(a,)* and the other half in the cow yard *(b)*. Inside of the cow yard, the water descends into another set of bored logs and is conveyed to another trough, where the calves *(c)* and steers *(d)* drink. From thence the remain-

ing water is used on the meadow. The walls of the yards are posted and closely planked, about eight feet high; the openings in which, as exhibited, are gates.

I am making arrangements for a piggery, on the plan here exhibited. 1, is the boiling and vegetable house; 2 and 3, are apartments for sows and pigs, and a boar; 4 and 5, for store hogs. The doors of the boiling house, the passage between 4 and 5, and the passage through the garden, to be in a direct line; so that a hand-cart can be conveniently used. The spring F, not affording sufficient water for the piggery and meadow, I intend to convey under ground, through bored logs, by the way of the dotted line K, L, the wanted supply; to be served first to the hogs, then to the garden or meadow, or pools presently to be mentioned. By raising a head of a few feet at the start, a bore of two and a half inches will afford abundant supply. I have already an open ditch in the direction K, L, for the purpose of conveying the creek water, when wanted, to an adjacent field; yet for several obvious reasons, a covered conduit is required for the use of the piggery.

To the intelligent, all the above is plain sailing; but connected therewith, I have another project in my head and heart, which is worthy of developement; but confessing my inability, I call on you, Mr. Ruffin, and my neighbor, Professor Armstrong, and any, and all others, whom either interest or charity may prompt to assist me. We all know that any given quantity of putrescent matter, will finally produce its equivalent; and is it not time that the farmer had learned to husband all his funds, instead of dissipating them for the benefit of the deserts? Can it be more decent or profitable to gather the stale excrements of man and other animals, and prepare these for manuring grounds; than to prepare and thus use the carcasses of cows, sheep, horses, &c., which may die?

I nave as good luck as my neighbors, yet in the course of the year I have four or five cows and horses, and from 40 to 50 sheep and lambs to die, which have heretofore been cast on a waste, and suffered to evaporate. These when alive were perhaps worth $150; now first, when dead, if judiciously prepared and used as manure, what is their value? and secondly, what is the most judicious preparation?

In answer to the first question I would merely remark, that it were absurd to say that the death of a brute is a loss to the world; and I suppose it equally absurd to assert that the owner cannot devise a method of appropriation which shall remunerate him for the loss. If a barrel of corn be ground and applied to the earth as a manure it will yield an additional barrel of corn. If, instead of applying the meal to the earth, it be fed to an animal, it will produce its equivalent in flesh; and if this flesh be fed to another animal or to the earth, it will again reproduce its equivalent. It is true that the atmosphere must and will have its share of all putrefying matter, but as it receives so it gives. It is also true that for the mutual prosperity of animals and vegetables, there must be a perfect equilibrium of the two materials; but most likely it is not in the power of man to regulate the balance: at any rate it is my strong desire to hold on to my matters, particularly to the flesh, as I consider it the most valuable.

By looking at the lower end of my cattle yards it will be seen that I have marked two pools; in these I propose depositing and preparing my dead carcasses for manuring my meadows. For this purpose must I use lime, ashes, potash, or other alkali, in connection with the urine from the yards, or with common water, or what? It is desirable to have it in a liquid state, and that the bones as well as the flesh be dissolved. I propose two pools to each yard, as exhibited, connected at bottom by auger holes; casting the carcasses into the uppermost, and when to be emptied, drawing from the lowermost; and if any matter should remain undissolved, more alkali and water to be added.

I deem it worthy of promulgation to state, that about twelve years past, I chopped a quantity of old field pine limbs, about six inches long, letting them remain in a pile till I thought they were half rotted, when they were carted to my cattle yard and attempted to be composted; but, to my surprise, they were preserved by the urine, so that I can to this day find them on a meadow as hard, and apparently as sound as when growing. This experiment proves that posts of any kind of wood may be made as lasting as locust. The draining from any horse or cow yard, can be led into a wooden or earthen pool, and the posts deposited therein will be saturated. MOUNTAINEER.

December 27, 1839.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

Navigation is restored to our late ice-bound streams, and is rapidly being restored to those north of us; while, at the same time, the rivers of the south-western states, after a long period of drought, have again become navigable. Immense supplies are now poured into market by these channels; and an active business prevails in all kinds of produce, but at comparatively low prices.

The British steam packets have been deterred from prosecuting their regular trips during the winter; and the New York packets being retarded by adverse winds, we are without recent intelligence from Europe.

In the tobacco market there is little variation this month. The quantity brought in for inspection is large, but readily finds purchasers at $3 to $4¼ per hundred for lugs, and $4¼ to 8 for leaf. Fine qualities (suitable for export, in leaf,) do not yet appear. The supply consists chiefly of the lowest sorts, as usual at the commencement of the year. There is no foreign export.

A good demand has existed for flour, both for foreign and coastwise shipment. Supplies have been large and sales commensurate—price $5½ to 5¾—with a prospect of decline, particularly when supplies from the west can arrive freely. The quantity to be received from thence is very great, and requires an extensive foreign demand to absorb it. In Ohio wheat is selling at 40 to 50 cents per bushel; flour at $3¼ to 4; and corn at 20 to 30 cents. In our markets wheat commands 108 to 115 cents. Corn 50 cents. Shipments of bread stuffs to a large extent are made to England, and some to France.

Supplies of cotton are now pouring in to all the southern and western ports at an unprecedented

rate. At Mobile 44,000 bales arrived in one week, and the receipts to the close of next month will exhibit a quantity surpassing all exportation at the opening of the season. Prices with us have undergone little change, and the current sales are at 8 to 9½ cents. In the large southern and western markets 5 to 9 cents.

Sugar from New Orleans is sold in the Atlantic ports at 5 to 6¼ cents, and if in bad condition at even lower rates.

The banks in this state, as in some others, are relying on the clemency of the state legislatures, and on their action will depend whether many of the charters be relinquished and the institutions closed. The stockholders are less interested than the community in the result.

Exchange on New York 7 per cent. premium, on London 15, on Philadelphia and Baltimore ½ to 1 per cent. premium. X.

February 22.

NITRATE OF SODA AS A MARURE.

From the Farmers' Cabinet.

In the last number of the Cabinet there is a paper from the Farmers' Magazine, stating the mode of application and uses of this article as a manure, all of which has been verified by the writer of this, last season, though he had not then heard of its application to agricultural purposes either in Europe or this country. It costs from three to four cents per pound by the sack, and is much cheaper than saltpetre. It should be sown early in the spring on the grass sod at the rate of about one hundred pounds to the acre, and perhaps a heavier dose might answer better, but experiment must determine that point.

The nitrate of soda, or cubic nitre as it is often called, can be purchased in quantities of the wholesale druggists. It exists naturally, in inexhaustible quantities, in the desert of Atacama in Peru, South America, from whence it is imported into this country, and is used for various chemical purposes. It forms a bed of variable thickness, covered with clay, of one hundred and fifty miles in extent. This article in the crude state in which it is imported into this country, is in dirty-white saline lumps, rather soft and friable, and damp on the surface. It attracts moisture from the air, and dissolves very readily by exposure to rain.

From present appearances, it seems probable that this substance will soon be found to be of great importance to the farmer as a manure, and the ease with which it can be transported will be a means of extending its benefits; and the greater the consumption of it, the cheaper it will become, as it will then become an object of commerce on a large scale.

If a number of farmers in different sections of our country would make an experiment the coming spring with the nitrate of soda, and communicate the result for publication in the Cabinet, great good might arise from it, and for the encouragement of those who are disposed to try it, the writer of of this can vouch for its efficacy in promoting the growth of grass. It would be well to try the effect of it on corn, applied in small quantities on the hill, and also on potatoes.

New manures which admit of easy transportation to distant places at a cheap rate, are invaluable to the agriculturist, and ought to be sought after, and brought into notice by all who desire the prosperity of our country.

CONTENTS OF THE FARMERS' REGISTER, NO. II. VOL. VIII.

ORIGINAL COMMUNICATIONS.

	Page
National importance of agriculture,	85
Number of silk-worms' eggs, of several kinds, to the ounce,	95
Miscellaneous remarks on root culture. Experiment in feeding mangel wurtzel to milch cows,	96
Spaces for silk worms. Mistakes of Dandolo's meaning by his translators,	
Injury to corn from stripping the leaves for fodder. Remarkable fertility and chemical composition of Scioto bottom land,	110
Remarks on Mr. Carter's proposed change of rotation. Insects and weeds,	111
Suggestions to experimenters on silk culture. Requisites for success. Necessity for healthy eggs and the means of obtaining them,	117
Cultivation of Irish and sweet potatoes,	119
On the profits of silk culture in Virginia,	119
Premiums awarded by the Agricultural Society of Charlotte	121
Remarks on different schemes of rotations	121
The five-shift rotation	122
Remittances by mail to publishers, may be free of postage	125
Farm-yards. Meadow. Manuring. Preservation of timber. Flesh converted to manure	126
Monthly commercial report	127

SELECTIONS.

	Page
Description of several Scotch farms, and the management thereon,	65
General description of D'Arcet's system and apparatus for ventilating and heating cocooneries,	77
Expenses and proceeds of crops	82
Cranberries,	83
Culture and consumption of mangel wurtzel,	83
Cotton seed,	83
Wonders of cultivation,	84
Allowance of water to horses,	84
Witch (or wire) grass,	85
Artesian well at Grenelle	85
Review of Dr. Richardson's account of fiorin grass	86
Observations on the cultivation of the sugar beet,	90
Sale of flowers,	95
Value of cotton seed as manure,	97
Poisoned cheese,	98
Cheap manuring,	98
The domestic cocoonery,	98
Rocky mountain flax,	101
Large seedling grape, raised by Van Mons,	101
Short-horned cattle,	102
Capture of a bear,	102
Working cows,	106
Hay-tea for swine,	106
Best form for a cocoonery,	108
Great wall of China,	108
On making good bacon,	109
Barn cellars,	109
Magnificent conservatory,	110
Notes on European agriculture,	112
Peach trees,	114
Agricultural excursion into St. John's Berkley (S. C.)	115
Jerusalem artichoke,	116
Treatment and food of growing stores	124
Nitrate of soda as a manure	128